

The Importance of Performance in Intermediate Accounting I on Performance in a Subsequent Accounting Course

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Abstract

The purpose of the research is to generate empirical evidence on the determinants of performance in accounting courses. With respect to performance, the academy is rife with anecdotal evidence. Our primary interest area was the influence of performance in Intermediate Accounting I on student performance in Intermediate Accounting II. Of the 108 accounting majors in the sample, 53 (55) took a user-approach (preparer-approach) introductory sequence. The results indicate that the students' average performance in Intermediate Accounting I explained approximately 50 percent of the variation in test scores in Intermediate Accounting II.

Introduction

Many of us often find ourselves preaching the gospel of 'work ethic' and the rewards 'down the road' to our students. It is satisfying to observe students experiencing success as we nurture them through the pitfalls and obstacles of Intermediate Accounting I. Many students who are above average performers in Intermediate Accounting I also tend to be those obtaining better positions upon graduation and frequently dominate the honors category at graduation. It appears obvious that there must be some association among the abilities, skills, and work ethics learned in Intermediate Accounting I and success in other accounting coursework. However, empirical evidence in this area appears to be nonexistent.

Prior research has examined whether taking a high-school accounting course(s) affects a student's performance in introductory college accounting

courses (Keef 1992, Mitchell 1985; Bergin, 1983; Baldwin and Howe, 1982; Smith 1968). However, this line of research has not been extended to whether a student's performance in a course such as the first Intermediate Accounting course. Intermediate Accounting I may serve as a filter for those who are not committed to the workload required of accounting majors, and may set the stage for their performance in other accounting courses.

This study addresses a key factor to accounting faculty because schools have to compete for students. Employers, parents, and prospective students voice concerns about outcomes assessment. Many ask how our graduates perform on the CPA examination. Because the Financial Accounting and Reporting section of the CPA examination focuses primarily on Intermediate Accounting topics, this research examines the association between performance in Intermediate Accounting I and II.

Theory Development

Control Variables

SAT scores have been shown to be associated with higher grades from high school through college. Data show that SAT Verbal and Math scores correlate with high school grades (College Entrance Board, 1994). Bernardi and Bean (1999) and Buckless *et al.* (1991) found SAT scores were influential in student performance in Intermediate Accounting I. The National Association of State Boards of Accountancy's (1994) data show that candidates with SAT Math or Verbal scores of 600 and above passed all parts of the CPA examination at a significantly higher rate.

The probability of an individual passing a section of the CPA examination increases with the level of the student's effort - their preparation (Leathers *et al.*, 1984). An association was found between the level of student effort in a course and their performance in that course (Hill *et al.*, 1996; Eskew and Faley, 1988). Bernardi and Bean (1999) found that effort accounted for approximately 50 percent of the variation explained by the models for test scores in Intermediate Accounting I.

Examinations of the effect of gender on performance have reported mixed results. Although Doran *et al.* (1991) found that males outperformed females. Tyson (1989) and Mutchler *et al.* (1987) found that females outperformed males. Other studies found that gender did not influence performance on accounting examinations (Fogarty *et al.*, 1998; Buckless *et al.*, 1991; Lipe, 1989). Hill *et al.*

(1996) observed different gender effects in a Principles sequence; while females outperformed males in a Principles of Accounting I course, the opposite was true in Principles of Accounting II. Buckless *et al.* (1991) found differences in the effect of gender among three universities at the introductory level; gender was only significant at one school--males scored higher than females. These authors also found males scored higher than females in an Intermediate Accounting course.

Performance in Other Courses

There is a dearth of research examining the effect of performance in Intermediate Accounting I on performance in Intermediate Accounting II. Given this research void, the hypothesis will rely on research documenting differences attributable to variations in education prior to college. Smith (1968) notes an increase in performance in college accounting courses for students who took high school accounting. However, Mitchell (1985) found this advantage was only valid for computational problems. Additionally, the competitive advantage of prior secondary courses disappeared by the final exam in the first introductory course (Bergin, 1983; Baldwin and Howe, 1982).

However, some might argue that students who 'survived' Intermediate Accounting I usually are firmly committed to becoming accounting majors and will develop sufficient study habits to learn the material. If this is the case, then performance in Intermediate Accounting I may not provide any additional insights into student performance in Intermediate Accounting II and the research hypothesis can be stated:

Ha: Student performance in Intermediate Accounting II will not differ by their performance in Intermediate Accounting I.

Research Method

Sample

The sample included 124 accounting majors who had completed the course requirements for Intermediate Accounting I over a four-year period. These subjects were evenly divided between four-year students who took their Principles of Accounting under either a user (62) or preparer (62) approach (Appendix). In this study, we limited our analysis to four-year students because of the comments on our earlier study (Bernardi and Bean, 1999) that led to analyzing the data without transfer students (Table 4, Panel B, p. 149). For all four groups

of students, the lead author was the only instructor in both Intermediate Accounting I and Intermediate Accounting II.

Attrition was calculated on those four-year students who successfully completed Intermediate Accounting I but who changed their majors between Intermediate Accounting I and II. There were 16 students who changed their major between Intermediate Accounting I and II. This resulted in a sample of 108 (53 user and 55 preparer) who completed Intermediate Accounting I and II. There were nine user-approach and seven preparer-approach students who changed their major after Intermediate Accounting I. Using the binomial tables for an anticipated 50-50 attrition rate, the difference due to approach was not significant.

During this research, the college changed its approach to the introductory accounting sequence twice. The data for the first three groups are from Bernardi and Bean (1999, p. 146). For the first (third) group in the study, all 33 (29) four-year students in Intermediate Accounting I took their introductory accounting sequence under a preparer (user) approach. In the second (fourth) group, there were 24 (9) user and 14 (15) preparer approach students depending on when they started their introductory accounting sequence (Bernardi and Bean, 1999, p. 147).

Control and Independent Variables

The research controls for relationships found in prior research between student performance and SAT scores, effort, gender, and introductory course orientation (i.e., users versus preparers). We test the relationships between performance and these variables to establish the similarity between our data and that used in prior research. This process is important because, without it, one could argue that the current sample is an outlier and cannot be considered reliable.

Five possible sources were used to obtain students' SAT scores: the college's admissions office, previous colleges, high schools, the College Boards, or the individual student. In all cases, this was done with the students' permission. Control was maintained for SAT scores received from students by having them provide a copy of their original SAT score sheet.

This research defined effort as the amount of on-time homework. In Intermediate Accounting II, students were assigned three major problems from each of the chapters in their text (Chasteen, et al., 1998, 1995, 1992). Additionally, students were also assigned 20 to 30 of the prior CPA examination questions included in their CPA review manual that applied to that chapter. Even though questions have not been released for some time, the questions in the CPA

review manuals change each year. However, the type, mix, and coverage of questions (i.e., theory versus problems) do not significantly change. Therefore, we believe that these assignments were quite similar. After reviewing the quantity of questions assigned for each chapter by year, the authors believe the workloads were similar. We found a two-to-three question range (i.e., about ten percent) in the assignments by semester over the four groups.

This research treated the preceding factors as control variables. The one independent variable was the students' performance over for the three tests they took in Intermediate Accounting I. An analysis of the four year groups of Intermediate Accounting I students indicates no significant difference ($p = .72$) among the classes for the overall examination grade.

Dependent Variable

Students' performance was assessed over three exams that were given outside of normal class times. The policy of examination timing was left to the instructor at this university. The reason for testing outside the normal class period was to provide a more comprehensive assessment of student performance. While there were only two sections of the class offered each semester, examinations were at the same time for both sections. Therefore, there was no selection bias in the enrollment.

Each test was structured to take about two hours and fifteen minutes, and students were allowed up to three hours to complete each exam. These examinations included 20 multiple-choice questions (40 percent of the points), one essay question worth 10 percent, and four-to-five major problems or theory questions (the remaining 50 percent). The point distribution used in testing is similar to that used in the majority of accounting programs for Intermediate Accounting. Dow and Feldmann (1997, p. 65) find that "*almost two-thirds of the respondents indicate that 90 percent or more of the examination points are on problems and multiple-choice questions.*"

Data Analysis

Even though the instructor was the same for all four groups, there is still the question of whether the performance results varied significantly from semester to semester in Intermediate Accounting II. The number and timing of examinations was constant over the four groups covering the following areas.

- Test 1: long-term investments, long-term debt, and leases;
 Test 2: pensions and postretirement benefits, income taxes, and stockholders' equity; and
 Test 3: accounting changes, earning per share, and advanced cash flows.

Table 1 shows the data for all three examinations by group. While there are some apparent differences, only the results of Test One vary with time ($p = .092$). In addition to being only marginally significant, year group explains only 1.6 percent of the variation in test scores. Given the marginal significance of the timing variable and its small explanatory power, the data were collapsed and examined without using year group as a variable.²

Table 1. Intermediate accounting II test grades by year group

<u>Test</u>	<u>Groups for Intermediate Accounting II</u>				<u>Test Average</u>
	<u>One</u>	<u>Two</u>	<u>Three</u>	<u>Four</u>	
One					
Average	78.4	76.6	74.9	72.0	75.8
Std Dev	[13.8]	[11.5]	[16.0]	[14.0]	[13.7]
Two					
Average	78.7	75.4	80.6	75.2	77.4
Std Dev	[9.9]	[9.9]	[13.1]	[12.1]	[11.2]
Three					
Average	78.0	80.0	82.2	76.2	79.2
Std Dev	[11.2]	[13.6]	[16.2]	[13.1]	[13.5]
Group Average					
Average	78.4	77.4	79.3	74.5	77.5
Std Dev	[10.8]	[10.0]	[13.5]	[12.1]	[11.5]
(n)	(29)	(32)	(24)	(23)	(108)

The performance data for Intermediate Accounting II were examined three ways. First, the data were analyzed using Verbal and Math SAT scores, effort, gender, and approach as the independent variables (Table 2, Panel A). This part of the analysis indicates that the explanatory power of the models is similar to that reported in Bernardi and Bean (1999) and other research. Second, student performance in Intermediate Accounting I was added as an independent variable

(Table 2, Panel B). Finally, outliers were removed from the data set and the analysis was repeated (Table 2, Panel C).

The data in Panel A of Table 2 show that SAT Verbal scores were significant for all tests and SAT Math scores were only significant for the second test. Students' effort (i.e., the amount of homework handed in on time) and gender were significant for all three tests. These control variables were tested to ensure that the results of the current research were consistent with prior findings. The data in Panel A indicate a significant difference in performance only on the first test between user-approach and preparer-approach students. This test covered investments in debt and equity securities, long-term debt, and leases.

The data in Table 2 Panel B show the results when student performance in Intermediate Accounting I was included in the analyses. Performance in Intermediate Accounting I was a powerful variable in all three models. Using univariate analysis, performance in Intermediate Accounting I explained 52.3 percent of the variation in test one, 53.4 percent of the variation in test two, and 51.8 percent of the variation in test three. We emphasize this because, although the other variables are still significant, they only explain, on average, an additional six to seven percent of the variation in the models.

There were no problems with heteroskedasticity and autocorrelated residuals for any of the Table 2 models. Although the condition index was over 30, the index dropped below 20 when the variables that were not significant were removed from the data set. Diagnostics such as RSTUDENT residuals and the H, COVRATIO, DEFITS, and DEBETAS statistics indicated that several observations could be considered outliers (SAS, 1986). Because of this, the data were analyzed with these outliers removed (Table 2, Panel C). On average, the amount of variation explained increased by approximately eight percent for the reduced data set.

Discussion and Conclusions

The analysis indicates that performance in Intermediate Accounting I is a powerful explanatory variable for performance in Intermediate Accounting II. The explanatory power of performance in Intermediate Accounting I exceeded our expectations. This suggests that the Intermediate Accounting I course is a potent indicator of success in more advanced accounting courses. In our opinion, accounting educators have an obligation to emphasize the importance of doing well in Intermediate Accounting I because of its carryover effects.

Table 2. Performance models for four-year students

Independent Variables	Panel A: Without Inter I Parameter Estimates			Panel B: With Inter I Parameter Estimates			Panel C: Without Outliers Parameter Estimates		
	Test-1	Test-2	Test-3	Test-1	Test-2	Test-3	Test-1	Test-2	Test-3
INTER I	N/A	N/A	N/A	0.821	0.667	0.812	0.866	0.616	0.794
	N/A	N/A	N/A	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]
VERBAL	0.064	0.053	0.072	0.026	0.024	0.033	0.021	0.029	0.041
	[.000]	[.000]	[.000]	[.066]	[.036]	[.019]	[.127]	[.003]	[.002]
MATH	0.016	0.030	0.015	0.011	0.015	0.000	0.021	0.022	-0.004
	[.387]	[.055]	[.425]	[.481]	[.215]	[.984]	[.124]	[.039]	[.776]
EFFORT	0.333	0.286	0.325	0.150	0.143	0.185	0.167	0.184	0.166
	[.000]	[.000]	[.000]	[.012]	[.004]	[.001]	[.004]	[.000]	[.002]
GENDER	7.557	4.064	7.371	4.557	1.616	3.955	4.900	1.782	3.867
	[.002]	[.040]	[.003]	[.019]	[.309]	[.043]	[.006]	[.187]	[.030]
APPR	-4.763	-1.471	-2.705	-4.641	-0.714	-0.049	-5.556	0.098	-0.180
	[.044]	[.429]	[.233]	[.011]	[.629]	[.558]	[.001]	[.938]	[.278]
F-Value	9.844	10.977	9.879	25.010	24.600	23.940	35.089	35.799	27.440
Prob > F	.000	.000	.000	.000	.000	.000	.000	.000	.000
Model R ²	.326	.350	.326	.598	.594	.587	.687	.698	.634
Sample N	108	108	108	108	108	108	103	100	102
Inter I	Grade in Intermediate Accounting I.								
Verbal	SAT Verbal Score			Math		SAT Math Score			
Effort	Percent of on-time homework for that test or overall in course.								
Gender	Male student (1)			Female student (0)					
Appr	User approach (1)			Preparer approach (0)					

While students who do not perform well in Intermediate Accounting I are not doomed to continued-below-average performance in later courses, their path to academic success is much steeper. A practical and necessary application of this research is to inform students in the first class period of Intermediate Accounting I how important this course is to their potential success. Because many of our students do not relate course content to future outcomes, we should stress that Intermediate Accounting I is a foundation course for the discipline. The road to passing the CPA examination and other career successes starts in Intermediate Accounting I.

For students (or for that matter anyone) to be motivated, they need to understand where a course is leading them. We believe that connecting the topics in both Intermediate Accounting I and Intermediate Accounting II to the practice of auditing and other professional activities increases the future value of these courses in the eyes of students. As accounting educators must 'market' our product; Intermediate Accounting is much more than two technical courses. These courses should foster critical thinking (Bernardi et al., 2000) and develop the 'skeptical attitude' essential to the practice of auditing.

A secondary finding relates to the approach (Appendix) used in the introductory course sequence. Given the complexity of the course material in Intermediate Accounting II and corresponding demand for different analytical skills, we would not anticipate any differences that could be attributed to the introductory approach in other upper division accounting courses. The results of this research also indicate that performance in Intermediate Accounting II was only related to the method used in the introductory course sequence for the first test that included investments in debt and equity instruments, long-term debt, and leases. This finding is affected by the significantly lower amount of homework handed in by the user approach students; however, the reason for this finding is not apparent.

Three limitations are evident in this research. The research included students from only one university. There was only one instructor for Intermediate Accounting I and Intermediate Accounting II, which may not be true in other institutions. The written examinations did not cover such skills as research, communication, and interpersonal skills. Although it is tempting to speculate about the causal components of performance in Intermediate Accounting II, we refrain from doing so in the belief that it will provide an impetus to move from anecdotal surmise to empirical evidence. Future research should consider the roles of work ethic, analytical skills and other variables in performance.

Endnotes

1. The authors are involved in several research projects and alternate lead author responsibilities; both authors contribute equally to all of their published work.
2. Even though the exams were different each semester, the chance of them "leaking out" was low. The lead author went over exams in the class period following that examination. While students had access to their examinations, they were required to hand them back to the lead author after a 20-minute critique. Because the instructor had a strict policy for missing exams, make up examinations occurred in about two percent of the cases. Finally, had there been a "leaking out" of examinations to following classes, one would expect the scores to consistently increase rather than decrease in the case of Test One or vary in the case of Tests Two and Three.

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Appendix. Review of the two approaches

The difference in material covered under a preparer versus a user approach in the second half of an introductory sequence is shown in the table below.

Coverage in the Second Half of an Introductory Accounting Sequence by Approach	
Preparer Approach	User Approach
Contributed Capital	Looking at different Industries
Corporate income statement	Changing Technology & management focus
Statement of stockholders' equity	Product, service, and project costing
Long-term Liabilities	Analysis of Information
Statement of cash flows	Financial versus managerial accounting
Financial statement analysis	GAAP for inventory valuation
International accounting	Intellectual Capital
Long-term investments	Privatization
Introduction to management accounting	Debt Capital
Operating costs and cost allocation	Equity Capital
Activity based costing	Risks of owning or issuing instruments
Job order and process costing	Internal control over financial instruments
Cost-volume-profit analysis & variable costing	Changing the debt-equity mix
The Budgeting Process	Debt, equity and taxes
Cost control using standard costing	Assessing risk and solvency
Operating & capital expenditure analysis	Problems of deficits and debt
Just-in-time operations	Need for budget reforms
Measures of quality	Improving government financial management

From Needles, et al. (1999)

From Pincus (1999-2000)

While the coverage is similar between the two approaches, the difference is the focus of the instruction and learning. The focus under a preparers approach is in the mechanics of how to prepare financial statements and the flow of information from one account to another in the process. In a preparers approach, the emphasis is on debits and credits. Even though the same information is covered under a users approach, the emphasis becomes how an individual uses this information. The mechanics of debit-credit entry are not included; rather, this approach emphasizes what the data mean to managers.