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Are M.B.A. Students a Good Proxy for Nonprofessional Investors?

W. Brooke Elliott
University of Illinois at Urbana–Champaign

Frank D. Hodge
University of Washington

Jane Jollineau Kennedy
University of Washington

Maarten Pronk
Tilburg University

ABSTRACT: We investigate a key assumption underlying much of the experimental research in financial accounting that graduate business students are a good proxy for nonprofessional investors. To conduct our investigation, we categorize recent experimental studies in financial accounting, based on the relative level of integrative complexity inherent in each study's task. We then conduct experiments using two tasks, one that is relatively low in integrative complexity and one that is relatively high in integrative complexity, and compare the responses of two groups of M.B.A. students and nonprofessional investors.

Our results suggest that using M.B.A. students as a proxy for nonprofessional investors is a valid methodological choice, provided researchers give careful consideration to aligning a task's integrative complexity with the appropriate level of M.B.A. student. M.B.A. students who have completed their core M.B.A. courses and are enrolled in or have completed a financial statement analysis course are a good proxy for nonprofessional investors in tasks that are relatively low in integrative complexity. Though less definitive, the majority of our tests also suggest that these students are a good proxy for nonprofessional investors in tasks that are relatively high in integrative complexity. However, care must be taken when using students in the first-year core financial accounting course. In tasks that are relatively low in integrative complexity,

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these students perform similarly to nonprofessional investors except when they are asked to make an investment decision. In tasks that are relatively high in integrative complexity, these students acquire information similarly to nonprofessional investors, but they do not appear to integrate the information in a similar manner.

Keywords: *financial statement analysis; investor sophistication; experimental research in accounting.*

Data Availability: *Experimental data are available from the authors.*

I. INTRODUCTION

Approximately 41 million nonprofessional investors invest directly in the stock market (Securities Industry Association 2002). Many research topics of interest to experimental financial accounting researchers, accounting regulators, and standard setters concern the effects of financial reporting alternatives on the judgments and decisions of these investors. Nonprofessional investors, however, are a widely dispersed, heterogeneous group of individuals, which makes them difficult to recruit as participants in financial accounting experiments. As a result, experimental financial accounting researchers who are interested in the behavior of nonprofessional investors typically use graduate business students, most commonly Master's in Business Administration (M.B.A.) students, as a proxy for these individuals. No direct evidence exists, however, demonstrating that M.B.A. students are a good proxy for nonprofessional investors. This study investigates the assumption that M.B.A. students are a good proxy for nonprofessional investors in experimental studies.

A common criticism of prior experimental studies that examine financial reporting issues is that M.B.A. students recruited to complete a financial statement analysis or investment task are somehow different from actual nonprofessional investors and, therefore, results may not generalize. For example, the average M.B.A. student likely has less experience buying and selling equity securities than the average nonprofessional investor, but likely has greater formal training in accounting, finance, and other business subjects. The question is not whether M.B.A. students are better or worse than nonprofessional investors at performing financial analysis tasks, but rather whether their judgments and decisions are similar such that the conclusions drawn from studies using M.B.A. students will inform us about the likely behavior of nonprofessional investors. Libby et al. (2002) argue that experiments that focus on the judgments of nonprofessional investors only require participants who possess basic accounting and investing knowledge. M.B.A. students often have some accounting and investing knowledge and therefore could fit these criteria. In fact, Libby et al. (2002) caution against using market participants unless it is necessary to achieve a specific research goal because they are a valuable and scarce resource.[1]

In this paper we discuss two key steps individuals carry out when completing a financial analysis task: information acquisition and information integration. In social psychology (e.g., Tetlock 1983; Lerner and Tetlock 1999), individuals' ability to integrate information when making judgments and decisions is discussed as a function of the information's integrative complexity, i.e., the complexity of connections involved in making a judgment or

[1] Nonprofessional investors are a heterogeneous population that we know little about, unlike the population of auditors. Although auditing research has investigated the reasonableness of students as surrogates for auditors, this literature does not apply to our research question. Auditors are professionals and auditing students are training to become professionals. In contrast, our focus is on M.B.A. students who likely have more accounting and finance training than the average nonprofessional investor and who are training to become managers, not nonprofessional investors. Though some M.B.A. students have investing experience, on average it is less than that of the nonprofessional investor population we wish to extrapolate to in experimental financial accounting research.

decision. After discussing integrative complexity, we classify recent experimental studies in financial accounting based on whether each study's task exhibits a relatively low or relatively high level of integrative complexity. Finally, we conduct experiments using two tasks, one that is relatively low in integrative complexity and one that is relatively high in integrative complexity, and compare the responses of M.B.A. students and nonprofessional investors.

Within each experiment, we test for differences in information acquisition and integration between nonprofessional investors and two groups of M.B.A. students: ''early'' M.B.A. students, who are midway through a core financial accounting course in the first year of an M.B.A. program, and ''select'' M.B.A. students, who have completed the first year of an M.B.A. program and have elected to take a financial statement analysis course. Our two student samples likely represent the lower and upper ends of the continuum of business, financial statement analysis, and investing knowledge within the M.B.A. student body, and reflect the range of students used in prior studies.[2] We believe our results will help guide future experimental research in financial accounting with regard to selecting appropriate participants. Our results will also inform groups, such as the Securities and Exchange Commission (SEC) and the Financial Accounting Standards Board (FASB), that consider financial accounting research that examines the behavior of M.B.A. students as nonprofessional investors in their deliberations and decisions.

Our first experimental task is similar to the task used in Hirst et al. (1995). Participants analyze a firm (Ultra Analyzers), its financial information, and an analyst report discussing the firm's performance and future potential. The analyst firm issuing the report either does or does not have an investment banking relationship with Ultra Analyzers. In completing this task, participants are expected to draw relatively simple connections between pieces of information for the purpose of making investment-related judgments and decisions. We classify this task as exhibiting a relatively low level of integrative complexity.

Overall, the results from experiment 1 indicate that early M.B.A. students, select M.B.A. students, and nonprofessional investors perform similarly, except when making investment decisions. Specifically, all three groups recognize that investment-banking relationships create incentives for analysts to optimistically bias their reports. As a result, the three groups make similar earnings potential and price appreciation judgments. However, the investment decisions of early M.B.A. students do not reflect this information to the same degree as do the investment decisions of select M.B.A. students and investors. These results suggest that early and select M.B.A. students acquire and integrate information for the purpose of making investment-related judgments similarly to nonprofessional investors when completing tasks that are relatively low in integrative complexity. Early M.B.A. students, however, may not be a good proxy if the task requires making an investment decision. It is important to note that many experiments focus on investment-related judgments, not decisions.

Our second experimental task is similar to the task used in Hodge et al. (2004). In this task, participants receive information about two firms (Firm D and Firm R) in the medical equipment and supplies industry, evaluate each firm's financial performance, calculate several ratios, and make investment decisions. Firm D discloses stock option compensation in the footnotes, while Firm R recognizes stock option compensation on the face of the income

[2] Prior studies use an array of M.B.A. students ranging from students in the first term of their first year to those in second-year electives, as well as different types of M.B.A. students, e.g., executive M.B.A. students, evening M.B.A. students, and daytime M.B.A. students.

statement. Firm D outperforms Firm R on four key income statement ratios *unless* participants put the two firms on equal footing with respect to stock option reporting (i.e., by either adjusting Firm D's income statement to reflect stock option compensation or adjusting Firm R's income statement to eliminate stock option compensation). Thus, Firm D *appears* to outperform Firm R due to differences in financial reporting choices, rather than differences in underlying economics.[3] In completing this task, participants are expected to draw relatively complex connections between pieces of information in the financial statements and notes to the financial statements for the purpose of making investment-related judgments and decisions. We classify this task as exhibiting a relatively high level of integrative complexity.

The results from experiment 2 indicate that early M.B.A. students and select M.B.A. students acquire similar information to investors. Initial tests on whether early and select M.B.A. students integrate information similarly to investors in tasks that are relatively high in integrative complexity are ambiguous. Refining our integration tests by excluding participants who did not acquire relevant information, however, reflects that the judgments and decisions of early (select) M.B.A. students tend to be dissimilar (similar) to those of investors. In our refined tests, early M.B.A. students responded similarly to investors on only one of our five integration measures. In contrast, select M.B.A. students responded similarly on all five integration measures.

Following our primary analysis, we explore whether sorting early M.B.A. students on variables that proxy for effort, experience, and knowledge results in subsamples of students who are good proxies for nonprofessional investors. The variables we examine are: time required to complete the materials, investing experience, financial statement analysis experience, work experience, number of accounting and finance courses, and participants' performance on a financial literacy quiz. Median split tests on each of these variables fail to identify a subsample of early M.B.A. students who are good proxies for nonprofessional investors in experiment 1 and experiment 2.

In summary, using M.B.A. students as a proxy for investors is, in many instances, a valid methodological choice, but researchers must give careful consideration to aligning a task's integrative complexity with the appropriate level of M.B.A. student. Select M.B.A. students are a good proxy for nonprofessional investors in tasks that are relatively low in integrative complexity. Though less definitive, the majority of our tests also suggest that these students are a good proxy for nonprofessional investors in tasks that are relatively high in integrative complexity. Early M.B.A. students are also a good proxy for nonprofessional investors in tasks that are relatively low in integrative complexity, except when making investment decisions. For tasks that are relatively high in integrative complexity, early M.B.A. students acquire information similarly to nonprofessional investors, but they do not appear to integrate this information in a similar manner. Thus, for tasks that are relatively high in integrative complexity, we recommend that researchers recruit select M.B.A. students when actual nonprofessional investors are not available.

In the next section, we discuss integrative complexity, and detail how we classify the tasks used in prior experimental financial accounting studies based on their level of integrative complexity. In Sections III and IV we describe our two experimental settings and discuss the results. In Section V we sort early M.B.A. students based on their demographic

[3] This task is representative of other tasks that involve the acquisition and integration of information provided in the notes to the financial statements regarding alternative accounting methods, e.g., operating versus capital leases and inventory methods.

characteristics to explore whether subsets of these individuals serve as good proxies for nonprofessional investors. Section VI summarizes our overall results and concludes.

II. THEORETICAL FRAMEWORK

Acquiring and Integrating Information

Individuals acquire and integrate information when making judgments and decisions (Hogarth 1980; Tetlock 1983; Lerner and Tetlock 1999). When researchers use M.B.A. students as a proxy for investors, they implicitly assume that these two groups acquire and integrate information in a similar manner, or at least that small differences in how each group completes these steps do not cause significant differences in the conclusions drawn from the results. We test the validity of this assumption by empirically evaluating whether early and select M.B.A. students acquire and integrate relevant information similar to investors when making investment-related judgments and decisions.

Within the accounting literature, Maines and McDaniel (2000) and Hodge et al. (2004) define information acquisition and integration. Information acquisition occurs when individuals identify and read specific pieces of relevant information sufficiently well to recall that information. Acquisition measures typically are not used as dependent variables in experimental studies examining financial accounting issues; they are most commonly included as manipulation checks. We are not interested in acquisition per se, but rather whether differences in information acquisition can help explain any potential differences in participants' subsequent judgments and decisions. Our primary focus, therefore, is on whether M.B.A. students and investors integrate information similarly when making judgments and decisions. Information integration involves two steps: evaluating the characteristics of the information, such as its consistency, and assimilating the various pieces of information to arrive at an overall judgment or decision.

In social psychology, individuals' ability to integrate information when making judgments and decisions is discussed as a function of the information's integrative complexity and consists of two components: differentiation and integration (Schroder et al. 1967; Streufert 1970; Streufert and Streufert 1978). According to Tetlock (1983) and Lerner and Tetlock (1999), differentiation refers to the number of distinct characteristics of an information set that an individual takes into account. Integration refers to the development of connections among these distinct characteristics and/or between these distinct characteristics and constructs independent of the information set. Essentially, ''differentiation'' and ''integration'' is evaluating and assimilating information in Maines and McDaniel's (2000) framework.

Classifying Prior Studies Based on their Level of Integrative Complexity

Given the important role that information acquisition and integration play in how individuals make judgments and decisions, we classify prior experimental studies in financial accounting based on the relative level of integrative complexity inherent in each study's task.[4] It is important to note that integrative complexity is a relative rather than absolute

[4] We recognize that experimental tasks can be classified using other dimensions. For example, our integration measure and integrative complexity are closely related to ''task complexity'' as defined by Bonner (1994). Bonner models task complexity as a function of the amount and clarity of information across three components of general information processing: input, processing, and output. Classifying tasks based on the amount and clarity of information requires an in-depth analysis of the experimental materials. We were unable to obtain copies of experimental materials for all the studies we classify in Table 1. For this reason, and for ease of exposition, we chose to classify our studies based on their level of integrative complexity.

measure. We therefore subjectively classify each task, dependent on whether it is relatively low or relatively high in integrative complexity. Relying on the definitions described above, we classify tasks that expect participants to draw relatively simple (complex) connections between distinct characteristics of the information set and subsequent judgments and decisions as relatively low (high) in integrative complexity.

Specifically, we classify 20 tasks from 19 recently published experimental financial accounting studies.[5] As shown in Panel A of Table 1, we classified 14 of the tasks (70 percent) as exhibiting relatively low integrative complexity and six of the tasks (30 percent) as exhibiting relatively high integrative complexity. Below we describe two of the tasks that we classified as relatively low in integrative complexity and two of the tasks that we classified as relatively high in integrative complexity.

We classified Hirst et al. (1999) and Mercer (2005) as relatively low in integrative complexity. In Hirst et al. (1999) participants received either point or closed-range earnings forecasts issued by management with a reputation for either high or low forecast accuracy.[6] Participants were expected to draw a relatively simple connection between the accuracy of management's prior forecasts and the form of the current forecast to make earnings predictions and provide confidence assessments of their earnings predictions. In Mercer (2005) participants received a disclosure from management describing either positive or negative earnings news, and the disclosure reflected either low or high forthcomingness. Participants were, again, expected to draw a relatively simple connection between management's forthcomingness and the sign of the earnings news when assessing management's reporting credibility.

In contrast to these two tasks, we classified the tasks in Kennedy et al. (1998) and Hirst et al. (2003) as relatively high in integrative complexity. In Kennedy et al. (1998) participants observed profitability, liquidity, growth, and share price information for two firms, Firm Q and Firm L. Firm Q reported a loss due to a litigation settlement that was certain, while Firm L reported a contingent environmental loss. Firm L disclosed an estimate of the loss in the environmental liability footnote in one of several forms: the most likely amount, the minimum, the maximum, or the range. Participants were expected to estimate the remaining parameters of the environment liability's distribution not provided in the footnotes (i.e., the minimum, maximum, and most likely amounts) and to estimate the amount they would have Firm L pay to resolve the contingency. Participants were expected to draw connections between each firm's financial information, managements' disclosure of the environmental liability, and their constructed distribution of the loss in order to assess the credibility of management's disclosures and the riskiness of each firm. Finally, participants were expected to use the information provided and their previous judgments to determine the percentage of capital they would invest in each firm. This task is relatively high in integrative complexity because management's choice of which parameter to disclose can be viewed as strategic and has subtle implications for the expected value of the loss, the credibility of the financial statements, the riskiness of the firm, and thus the desirability of investing in the firm relative to a firm with a known liability.

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[5] An author and an unaffiliated researcher independently classified each study based on the relative level of integration needed to complete each study's experimental task. The author and researcher classified 18 of the 20 tasks in the same manner (inter-rater reliability = 0.76), and reconciled differences on the other two as a group.

[6] We do not discuss all of the information within a given study's task, but rather focus on the key attributes of each study. Most studies also contain other information, such as background information about the firm and general information about the firm's industry.

TABLE 1
Classification of Recent Experimental Studies in Financial Accounting that Use M.B.A. Students as Proxies for Investors

Panel A: Classification Matrix Based on the Relative Level of Integrative Complexity Inherent in Each Experimental Task[a]

Relatively Low Integrative Complexity	Relatively High Integrative Complexity
Bloomfield and Libby (*JAR* 1996)	Hirst, Jackson, and Koonce (*CAR* 2003)
Bloomfield, Libby, and Nelson (*AOS* 1999)	Hodge, Kennedy, and Maines (*TAR* 2004)
Bloomfield and Wilks (*TAR* 2000)	Kennedy, Mitchell, and Sefcik (*JAR* 1998)
Bloomfield, Libby, and Nelson (*CAR* 2003)	Krische (*TAR* 2005)
Elliott (*TAR* 2006)	Luft and Shields (*TAR* 2001)
Frederickson and Miller (*TAR* 2004)	Maines and McDaniel (*TAR* 2000)
Hirst, Koonce, and Simko (*JAR* 1995)	
Hirst, Koonce, and Miller (*JAR* 1999)	
Hodge (*TAR* 2001)	
Lipe (*AOS* 1998), task 1	
Lipe (*AOS* 1998), task 2	
Maines and Hand (*TAR* 1996)	
Mercer (*TAR* 2005)	
Nelson, Krische, and Bloomfield (*JAR* 2003)	

Panel B: Task Description for Studies that use M.B.A. Students as Proxies for Investors

Study	Task Description	Relative Level of Integrative Complexity[a]
Bloomfield and Libby (1996)	In a laboratory market, participants traded a security after observing two signals about the security's value. The signals were: ''Value indicated by EPS = X price'' or ''Value indicated by OTHER information = X price.''	Low
Bloomfield et al. (1999)	In a laboratory market, participants traded a security after receiving one or three signals about the security's value. The following signals were provided on 11-point scales: The rank order of a firm's return on equity (ROE); the rank order of a firm's growth in ROE; and the rank order of a firm's book value per share.	Low
Bloomfield and Wilks (2000)	In a laboratory market, participants traded a pair of securities after observing six of seven or two of seven signals about the variability of the securities' returns.	Low
Bloomfield et al. (2003)	In a laboratory market, participants predicted future return on equity (ROE) and made trading decisions after observing current and prior years' ROE.	Low
Elliott (2006)	In an experiment, participants made earnings potential judgments and an investment decision based on an earnings release that reported only GAAP earnings, emphasized either GAAP or pro forma earnings or provided a reconciliation of GAAP and pro forma earnings.	Low

(*continued on next page*)

TABLE 1 (Continued)

Frederickson and Miller (2004)	In an experiment, participants made stock price judgments based on an earnings release that reported only GAAP earnings or that reported both GAAP and pro forma earnings.	Low
Hirst et al. (1995)	In an experiment, participants made stock price appreciation judgments based on a report from an analyst who had (or did not have) an investment banking relationship with the firm. The report was either favorable or unfavorable and contained either strong or weak arguments.	Low
Hirst et al. (1999)	In an experiment, participants made earnings predictions and confidence assessments after receiving either point or closed-range earning's forecasts issued by management with either high or low forecasting accuracy.	Low
Hirst et al. (2003)	In an experiment, participants made earnings growth potential judgments and provided price-earnings multiples after receiving opportunistic or non-opportunistic estimates of future software sales and a related SEC disclosure that either included or excluded the effect on the financial statements of misestimating future product sales.	High
Hodge (2001)	In an experiment, participants made earnings potential judgments after evaluating a firm's audited financial statements and an optimistic unaudited letter to shareholders.	Low
Hodge et al. (2004)	In an experiment, participants made an investment decision between two firms: one that recognized stock option compensation expense and one that disclosed stock option compensation expense.	High
Kennedy et al. (1998)	In an experiment, participants decided how much to invest in a firm that disclosed a potential environmental liability as a range, a minimum/maximum, or the midpoint of a range.	High
Krische (2005)	In an experiment, participants made earnings forecasts based on a firm's current earnings release, which varied the information repeated about the firm's (previously disclosed) prior-year gain or loss on disposal.	High
Lipe (1998), task 1	In an experiment, participants made risk assessments and investment decisions after viewing 52 weeks of market prices for six firms or summarized information (e.g., variance and covariance measures) calculated from the weekly stock price data for the six firms. Participants also received information about the expected returns of the six firms.	Low

(*continued on next page*)

TABLE 1 (Continued)

Study	Task Description	Relative Level of Integrative Complexity[a]
Lipe (1998), task 2	In an experiment, participants made risk assessments and investment decisions after viewing market summary, accounting information, or combined market summary and accounting information for three unidentified NYSE firms. Market summary data were annual returns, variance of returns, and covariance of returns information. Accounting information was the firm's current ratio, leverage ratio, return on equity, variance in annual earnings price (E/P) ratios, and the covariance of annual E/P ratios.	Low
Luft and Shields (2001)	In an experiment, participants made future earnings predictions after receiving data on intangible expenditures and gross profits at 20 manufacturing plants. Expenditures are either capitalized or expensed.	High
Maines and Hand (1996)	In an experiment, participants made earnings forecasts after viewing a minimum of ten years of prior quarterly EPS information for each of two series. The two series were: a typical Brown-Rozeff series and a seasonal random walk, or series for two actual companies.	Low
Maines and McDaniel (2000)	In an experiment, participants assessed the risk of investing in a firm's stock and provided a per-share value for the stock after viewing financial information about the firm. The financial information provided information about the volatility of unrealized gains (losses) in one of three formats: SFAS No. 115 statement of stockholders' equity, SFAS No. 130 statement of stockholders' equity, or SFAS No. 130 statement of comprehensive income.	High
Mercer (2005)	In an experiment, participants assessed management's credibility after viewing a management disclosure that reflects either high or low management forthcomingness about positive or negative unexpected earnings news.	Low
Nelson et al. (2003)	In an experiment, participants made trading decisions after observing the recommendation of a trading strategy, along with predicted earnings growth, past earnings growth, and past sales growth.	Low

[a] An author and an unaffiliated researcher independently classified each study based on the relative level of integrative complexity inherent in each study's experimental task. The author and researcher classified 18 of the 20 tasks in the same manner (inter-rater reliability = 0.76), and reconciled differences on the other two as a group. We classify experimental tasks that expect participants to draw relatively simple (complex) connections among the distinct pieces of information provided for the purpose of making investment-related judgments and decisions as relatively low (high) in terms of integrative complexity.

In Hirst et al. (2003) participants were provided with financial information for the current year and three previous years for a company that develops software products and capitalizes related development costs consistent with SFAS No. 86. Participants were provided with a summary of SFAS No. 86, and told that a new SEC rule required disclosure of the accuracy of prior estimates. As part of this new supplemental disclosure, participants were provided with management's original estimate of the software development asset for a three-year period, as well as the subsequently realized actual amount of the asset. Management's estimates of future software sales were either relatively accurate or opportunistic. In addition, the supplemental disclosure either provided or was silent about the implications of any mis-estimation of future software sales on the previous three years of reported software development assets and earnings.

Participants were expected to draw connections between the implications of management's past estimation accuracy on the reported software development asset and earnings, current financial performance, and the potential for earnings growth in order to estimate a price-earnings multiple. The authors conclude that disclosures must be sufficiently transparent in order for investors to make complex connections.

Before describing our two experimental settings, one that is relatively low in integrative complexity and one that is relatively high in integrative complexity, we discuss several factors that make it difficult to predict whether the judgments and decisions of early and select M.B.A. students will be similar to the judgments and decisions of nonprofessional investors.

Factors that May Influence Participants' Performance on a Task

Bonner and Lewis (1990) and Libby and Luft (1993) provide a framework for discussing potential reasons why information acquisition and integration might differ between M.B.A. students and nonprofessional investors. According to their models, experience and ability create participants' internal state of knowledge. Knowledge and ability determine performance.[7]

Ability is the mental capacity to acquire and use knowledge so as to accomplish the objective specified. Although ability is an unobservable internal state, results of standardized tests for college entrance and graduate programs, and employment history provide some indications of ability. For example, M.B.A. students presumably possess relatively high ability based on their performance on the Graduate Management Admissions Test (GMAT) required by most graduate business programs.[8] Investors are likely to be more heterogeneous with respect to ability, but the simple fact that they continue to invest suggests that they likely possess some minimum level of ability. Although effects of ability are possible, the high likelihood that M.B.A. students and investors possess the requisite ability to complete financial analysis tasks likely weakens this link to performance relative to the other variables (Libby 1995).

Experience provides the opportunity for learning (Libby 1995). Learning depends on whether the experience accurately signals the need to learn and provides feedback that enables learning. For example, investors may make ''good'' investments in a bull market and attribute their success to their investment strategy or quality of analysis when, in fact, the success of their investment may be impervious to that investment strategy. ''Errors''

[7] Libby and Luft (1993, 433) also recognize the indirect role of effort: ''Effort determines the degree to which available knowledge and abilities are brought to bear on the task and (along with abilities) determines the degree to which people acquire knowledge from experiences.''

[8] The lower end of acceptable GMAT scores in the M.B.A. programs of our participants is generally 650 (85th percentile), indicating high ability.

can only be corrected when it is clear why the error occurred and how to correct the action. As a person encounters more variations of market conditions that test their investment models or strategies, they receive more feedback, and thereby acquire more knowledge. We expect that investors, on average, have more investing experience than do early or select M.B.A. students and have therefore derived more investing-related knowledge from this experience.

M.B.A. students typically garner knowledge from reading source materials, such as textbooks, financial press articles, and class notes. M.B.A. students also typically conduct financial analysis, and make judgments and decisions based on their analysis, through case studies. Although M.B.A. students may acquire basic knowledge fairly early in the program, knowledge of business and investing likely increases as they progress through the program, are exposed to more cases and examples, and discuss investment-related issues with classmates. We expect that M.B.A. students early in the first year of the program will have less knowledge from formal education and training than M.B.A. students who have completed the first year of the M.B.A. program and are enrolled in an elective financial statement analysis course, and that both groups of M.B.A. students will have more formal-education-based knowledge than the average nonprofessional investor.

As the above discussion suggests, individuals possess multiple types of knowledge garnered from multiple sources, all of which can either facilitate, have no effect on, or hinder completing a given task. Whereas nonprofessional investors likely possess more experience-based knowledge about investing than M.B.A. students, M.B.A. students likely possess more formal-education-based knowledge about investing than nonprofessional investors. Although the ''sources'' of knowledge for each group likely differ, research has yet to examine whether their investing-related judgments and decisions differ.

III. EXPERIMENT 1

In our first experiment, we investigate whether M.B.A. students and nonprofessional investors acquire and integrate information similarly when completing an experimental task that is relatively low in integrative complexity.

Task and Procedure

Our experimental task is similar to the task used in Hirst et al. (1995). We do not replicate Hirst et al. (1995), but rather use their overall experimental design to examine our research question. Hirst et al. (1995) manipulate three independent variables: the source of a research report (an analyst with or without an investment banking relationship with the firm), the report's conclusion (favorable or unfavorable), and the strength of arguments supporting the conclusions (strong or weak). We hold the report's conclusion and strength of arguments constant at ''favorable'' and ''strong,'' and manipulate the source of the research report in our experimental task.

Participants received the experimental materials at the end of class (M.B.A. students) or in the mail (investors). Each set of experimental materials contained two booklets. Booklet One consisted of information about a firm (Ultra Analyzers) in the infrared gas analyzer industry, including an industry overview, income statements, balance sheets, select ratios for the last three years, and an analyst report from a securities firm (American Financial). We manipulated whether American Financial has, or does not have, an investment banking relationship with Ultra Analyzers. After analyzing this information, participants answered several questions about Ultra Analyzers' earnings potential and price appreciation, about the credibility of American Financial's research report, and about the independence of American Financial.

At the end of Booklet One, separated from the other information, was additional information about Ultra Analyzers' performance relative to the performance of two other firms (Firm H and Firm Z) in its industry.[9] This additional information revealed that Ultra Analyzers' performance was currently slightly below that of Firm H and Firm Z. The analyst report suggested, however, that over the next 12 months Ultra Analyzers would begin to outperform the other two firms. After reviewing this information, participants decided what percentage of $10,000 to invest in each of the three firms. They then completed Booklet Two, which contained manipulation-check questions, demographic questions, and a financial literacy quiz of 15 questions.[10]

We classify this task as relatively low in integrative complexity because the basic connection that participants are expected to make is between the incentives that investment banking relationships create and analysts' reports. If participants make this connection, then their performance evaluations should be correspondingly lower in the investment banking condition.

Participants

One hundred twenty-four M.B.A. students from a large state university and 37 nonprofessional investors serve as participants. Eighty-two of the students were midway through the core financial accounting course in the first term of the first year of their M.B.A. program. We refer to these participants as ''early'' M.B.A. students. The other 42 students had completed the first year of the M.B.A. program and were enrolled in a financial statement analysis elective. We refer to these participants as ''select'' M.B.A. students. Our two student groups likely represent the lower and upper ends of the continuum of financial statement analysis and investing knowledge within the M.B.A. student body, and reflect the range of students used in prior experimental studies in financial accounting. Our 82 early (42 select) M.B.A. students have an average of 5.2 (5.9) years of work experience and 2.9 (3.9) years of experience investing in the common stock or debt securities of firms. Early (select) M.B.A. students have taken an average of 1.8 (3.5) accounting, 1.0 (2.9) finance classes, and 35 (66) percent have evaluated a company's performance by analyzing financial statements more than five times.[11]

Comparing the M.B.A. program from which we recruited our participants (''our program'') to the top 30 M.B.A. programs reported by *BusinessWeek* magazine reveals that our program is representative of other top M.B.A. programs across several measures. For 2004, *BusinessWeek* reported that the median GMAT score for our program was 680 and the average years of work experience was 5.3 years. The median GMAT score for the top 30 M.B.A. programs in the rankings was 683 and the average years of work experience was 4.9 years (*BusinessWeek* 2004).[12]

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[9] This information was not provided in Hirst et al. (1995) because they did not ask for investment decisions.

[10] Nine of the 15 items on our financial literacy quiz are adapted from or identical to questions that Katherine Schipper of the FASB and Roman Weil of the University of Chicago use at various educational programs for corporate directors. Approximately 1,500 directors have completed their full quiz, which consists of 25 questions. Our remaining six items are from an introductory accounting class' final exam.

[11] We use our demographic variables in subsequent exploratory analysis. For the sake of brevity, we report descriptive statistics for these variables only once, in Table 7.

[12] *BusinessWeek* does not report incoming grade point averages (GPAs) in its rankings, but *U.S. News & World Report* does. In 2004, *U.S. News* reports that the average incoming GPA for our program was 3.40/4.00 (*U.S. News & World Report* 2004). The average incoming GPA across the top 30 schools in the *U.S. News & World Report* rankings is also 3.40/4.00. Our early and select participants have a median GMAT score of 675, an average GPA of 3.5, and have worked an average of 5.5 years before entering the M.B.A. program.

The investors who completed the experiment are members of the National Association of Investors Corporation (NAIC). We believe this group of investors meets the FASB's criteria that users of financial reports ''have a reasonable understanding of business and economic activities and are willing to study the information with reasonable diligence'' (FASB 1978). The NAIC consists of approximately 300,000 individual and investment club members with a total portfolio value greater than $116 billion (NAIC 2003). Nine out of ten NAIC club members buy securities for their own accounts in addition to making club investments (O'Hara and Janke 1998). We obtained our investor sample from a NAIC regional chapter's membership base. Participants indicated their willingness to participate while completing a survey administered by a regional chapter of the NAIC in 2001. Of our 37 participants, 53 percent are female, the median age is 50–59 years, they have been investing for an average of 14 years, and 76 percent have a college education. The membership base of the NAIC as a whole is 67 percent female, the median age is 56 years, and 74 percent of members have a college education (NAIC 2003). All of our nonprofessional investors have invested in debt or equity securities and 77 percent have evaluated a company's performance by evaluating its financial statements more than five times. On average, they have taken 1.9 and 1.6 accounting and finance courses, respectively.[13]

Results

Consistent with other experimental research (e.g., Maines and McDaniels 2000; Hodge et al. 2004), we analyze participants' information acquisition and integration. Our purpose in doing so is *not* to measure performance per se, but rather to examine whether early and select M.B.A. students acquire and integrate information similarly to nonprofessional investors such that any conclusions drawn from the analysis are the same regardless of participant type.

Acquisition

We measure acquisition by asking participants three questions: (1) whether American Financial had an investment banking relationship with Ultra Analyzers, (2) whether the stock research report issued by American Financial was favorable or unfavorable toward Ultra, and (3) whether American Financial's research report covered only Ultra Analyzers, only Firm H, only Firm Z, or all three firms. As shown in Panel A of Table 2, 97 percent of nonprofessional investors correctly answered the question of whether American Financial had an investment banking relationship with Ultra Analyzers compared to 81 percent of early M.B.A. students and 86 percent of select M.B.A. students. Although correct response rates were high for all three groups, Panel B shows that the rate for nonprofessional investors is higher than that for early ($\chi^2 = 5.88$, $p = 0.02$) and select ($\chi^2 = 3.30$, $p = 0.07$) M.B.A. students. There were no acquisition differences on the second question regarding the favorability of the stock report as all participants responded correctly. Similarly, nearly all participants correctly answered the third question asking which firms American Financial covered (all p-values > 0.32).

In conclusion, it seems that most participants in each group acquired the distinct characteristics of the task, although approximately 19 percent of the early M.B.A. students and 14 percent of the select M.B.A. students missed an important fact, i.e., the presence or

[13] The NAIC does not publish information on the investing experience of its membership base. Hodge (2003), however, reports that the 414 NAIC investors who completed the NAIC regional chapter's survey in 2001 have an average of 9.9 years of investing experience. These investors are 68 percent female, their median age is between 50–59 years, and 75 percent have a college education.

TABLE 2
Experiment 1 Acquisition Variables

Panel A: Descriptive Statistics

Dependent Variable	Early M.B.A.[a] n ≈ 82	Investor n ≈ 37	Select M.B.A. n ≈ 42
1: Did American Financial have a position in the securities of Ultra Analyzers?[b]			
Correct	81%	97%	86%
Incorrect	19%	3%	14%
2: Was the common stock research report issued by American Financial for Ultra Analyzers unfavorable or favorable?[b]			
Correct	100%	100%	100%
Incorrect	0%	0%	0%
3: Did American Financial issue a common stock research report for only Ultra Analyzers, only Firm H, only Firm Z, or for all three firms?[b]			
Correct	93%	97%	93%
Incorrect	7%	3%	7%

Panel B: Planned Comparisons by Participant Group

Variable	Early vs. Investor	Select vs. Investor	Early vs. Select
1	$\chi^2 = 5.88$, $p = 0.02$	$\chi^2 = 3.30$, $p = 0.07$	$\chi^2 = 0.52$, $p = 0.47$
2	$\chi^2 = 0.00$, $p = 1.00$	$\chi^2 = 0.00$, $p = 1.00$	$\chi^2 = 0.00$, $p = 1.00$
3	$\chi^2 = 0.98$, $p = 0.32$	$\chi^2 = 0.85$, $p = 0.36$	$\chi^2 = 0.00$, $p = 1.00$

[a] Early M.B.A. students were midway through their core financial accounting class. Select M.B.A. students were second-year students taking a financial statement analysis elective class. Investors are individual investors who are members of the National Association of Investors Corporation.
[b] "Correct" is the percentage of participants who correctly answered the question.

absence of an investment banking relationship. This may be due to these participants paying less attention, which we consider in Section V.

Integration

To assess information integration we first asked questions pertaining to the relation between investment banking relationships and analysts' research reports to determine whether participants understood how analysts' incentives could influence their reports. Specifically, we asked about the credibility of American Financial's stock report and about American Financial's independence. These two questions are highly related ($\alpha = .80$); thus, we report results using a simple-average composite measure. We report descriptive statistics in Panel A of Table 3 and test for differences in Panel B. Results reveal that the composite measure for all three participant groups was significantly influenced by the investment banking relationship in a consistent manner (all p-values < 0.01).[14]

We next asked participants to judge the extent to which American Financial's stock report was influenced by incentives to please Ultra Analyzer's management. Results in Panel B of Table 3 reveal a significant investment banking effect across all three participant groups

[14] Results are inferentially identical if we examine the credibility and independence judgments separately.

TABLE 3
Experiment 1 Integration Variables

Panel A: Descriptive statistics [mean (standard deviation)] for Non-Investment Banking (NIB) and Investment Banking (IB) Conditions

	Early M.B.A.[a]		Investor		Select M.B.A.	
Dependent Variable	**NIB[b] n ≈ 40**	**IB n ≈ 42**	**NIB n ≈ 18**	**IB n ≈ 19**	**NIB n ≈ 19**	**IB n ≈ 23**
1: Credibility/Independence Composite[c]	6.8 (1.9)	4.8 (2.3)	6.8 (1.8)	3.7 (2.4)	7.3 (2.2)	4.3 (2.0)
2: Incentive to please management[d]	4.9 (2.5)	6.4 (2.5)	5.3 (2.7)	8.0 (1.9)	4.6 (2.9)	6.9 (2.4)
3: Earnings potential[e]	7.2 (1.3)	6.8 (1.7)	5.6 (1.8)	5.1 (1.7)	7.2 (1.9)	7.1 (1.9)
4: Price appreciation[f]	7.0 (1.7)	6.4 (2.1)	5.4 (2.0)	5.1 (2.1)	6.6 (1.9)	6.4 (2.1)
5: Percent who prefer to invest in Ultra Analyzers[g]	60%	59%	50%	5%	84%	39%
6: Percent of $10,000 invested in Ultra Analyzers[g]	43% (20%)	42% (21%)	47% (32%)	13% (16%)	54% (23%)	35% (8%)

Panel B: Planned Comparisons for each Participant Group by Investment Banking Condition

Variable	**Early NIB vs. Early IB**	**Investor NIB vs. Investor IB**	**Select NIB vs. Select IB**
1	$t = 4.31$, $p < 0.01$	$t = 4.40$, $p < 0.01$	$t = 4.62$, $p < 0.01$
2	$t = 2.60$, $p = 0.01$	$t = 3.52$, $p < 0.01$	$t = 2.75$, $p < 0.01$
3	$t = 1.30$, $p = 0.21$	$t = 0.90$, $p = 0.37$	$t = 0.05$, $p = 0.96$
4	$t = 1.40$, $p = 0.17$	$t = 0.52$, $p = 0.61$	$t = 0.38$, $p = 0.71$
5	$\chi^2 = 0.00$, $p = 0.97$	$\chi^2 = 9.40$, $p < 0.01$	$\chi^2 = 8.80$, $p < 0.01$
6	$t = 0.17$, $p = 0.87$	$t = 4.10$, $p < 0.01$	$t = 3.30$, $p < 0.01$

(*continued on next page*)

TABLE 3 (Continued)

[a] M.B.A. students were midway through their core financial accounting class. Select M.B.A. students were second-year students taking a financial statement analysis elective class. Investors are individual investors who are members of the National Association of Investors Corporation.

[b] The ''NIB'' (''IB'') column presents descriptive statistics for those participants assigned to the condition where American Financial does not have (does have) an investment banking relationship with Ultra Analyzers.

[c] Our composite measure is the simple average of participants' responses to a credibility and an independence question. These two measures are related (α = .80) and both are measured on an 11-point scale. The credibility question asked ''How credible is the common stock research report issued by American Financial for Ultra Analyzers?'' with endpoints labeled ''not at all credible'' and ''very credible.'' The independence question asked participants to respond to the following: ''I believe American Financial was in a position to be _____ with respect to Ultra Analyzers,'' with endpoints labeled ''not at all independent'' and ''completely independent.''

[d] We asked participants ''To what extent do you believe each of the following factors influenced American Financial when they were formulating their conclusion that Ultra Analyzer exhibits very strong potential for price appreciation over the next 12 months.'' Participants rated ''American Financial's desire to please management'' on an 11-point scale with endpoints labeled ''very little influence'' and ''very large influence.''

[e] Participants responded to the following question: ''I believe that Ultra Analyzers' earnings potential for fiscal year 2005 is _____.'' [very weak (1) to very strong (11)]

[f] Participants responded to the following question: ''I believe that Ultra Analyzers' stock has _____ potential for price appreciation in fiscal 2005.'' [very low (1) to very high (11)]

[g] Participants responded to the following question: ''Recall that you have decided to invest $10,000 in the infrared gas analyzer industry. What percentage of the $10,000 would you invest in each firm (the total must add up to 100)?'' Participants indicated the percentage that they would invest in Firm H, Firm Z, and Ultra Analyzers. We examine two investment decision dependent measures: (1) the percentage of participants who invested the majority of their funds in Ultra Analyzers (question 5), and (2) the percentage of the $10,000 that participants invested in Ultra Analyzers (question 6). Our first decision variable is coded 1 if participants invested the majority of their funds in Ultra, and 0 otherwise.

(all p-values $\leq$ 0.01).[15] These results suggest that early M.B.A. students, select M.B.A. students, and nonprofessional investors similarly assess the effect an investment banking relationship can have on analyst reports.

To further examine information integration we examine participants' earnings potential judgments and their share price appreciation judgments. Results in Panel B of Table 3 reveal that for all three participant groups, the investment banking relationship did not significantly influence their earnings potential or price appreciation judgments (all p-values $\geq$ 0.17). Our lack of a price appreciation effect is consistent with the findings of Hirst et al. (1995).

Our final test of integration is whether participants' investment decisions are similarly influenced by the investment banking relationship. Recall that we designed our experiment such that Ultra Analyzers is currently underperforming Firms H and Z, but is expected to start outperforming its two competitors over the next 12 months according to the research report. If participants believe the research report to be credible, then they are likely to invest more of their $10,000 in Ultra Analyzers than will participants who do not believe the report is credible. We examine this final component of integration by asking participants' to allocate an investment of $10,000 to Ultra Analyzers, Firm H, and/or Firm Z. We examine two investment decision dependent measures: (1) the percentage of participants who invested the majority of their funds in Ultra, and (2) the percentage of the $10,000 that participants invested in Ultra Analyzers.

Our first decision variable is coded 1 if participants invested the majority of their funds in Ultra, and 0 otherwise. We use a dichotomous variable in addition to the percentage of the $10,000 that participants invested to reduce the opportunity for participants to simply allocate an equal percentage of the $10,000 between the firms. We report descriptive statistics for our investment decision variables in Panel A of Table 3 and test for differences in Panel B.

The results show that across both of our investment decision variables, nonprofessional investors and select M.B.A. students are more likely to invest in Ultra Analyzers in the non-investment banking condition than in the investment banking condition (all p-values $<$ 0.01). In contrast to these two groups, early M.B.A. students are not more likely to invest in Ultra Analyzers in the non-investment banking condition (all p-values $\geq$ 0.87). Importantly, these results are not due to acquisition failure as results using only early M.B.A. students who passed all of the acquisition hurdles (i.e., answered all of the manipulation check questions correctly) are qualitatively similar. Thus, it appears early M.B.A. students do not integrate information similarly to nonprofessional investors when making investment decisions. As a result, conclusions drawn about the effect of an investment banking relationship on participants' investment decisions would differ if one were to use early M.B.A. students as proxies for nonprofessional investors, rather than select M.B.A. students or actual nonprofessional investors.[16]

Based on the above results, select M.B.A. students are good surrogates for nonprofessional investors in tasks that are relatively low in integrative complexity. Early M.B.A. students seem to acquire and integrate information similarly to nonprofessional investors

[15] In addition to asking participants to judge the extent to which American Financial's stock report was influenced by incentives to please Ultra Analyzer's management, we also ask participants the extent to which the stock report reflects American Financial's true beliefs about Ultra Analyzer's future performance. Similar to Hirst et al. (1995), we compute a variable called "Incentive," which is the difference between the responses to these two questions. Consistent with Hirst et al. (1995), results (not tabulated) reveal a significant investment banking effect across all three participant groups (all p-values $\leq$ 0.01).

[16] Our experiment 1 integration results are inferentially identical using nonparametric tests.

except when making investment decisions. This suggests that early M.B.A. students are good surrogates for investors when the research question focuses on non-investment decision dependent variables.

IV. EXPERIMENT 2

In our second experiment we investigate whether the conclusions drawn from using M.B.A. students versus nonprofessional investors would differ when completing a task that is relatively high in integrative complexity.

Task and Procedure

Our task is similar to the task used in Hodge et al. (2004). We do not replicate Hodge et al. (2004), but rather use their overall experimental design to examine our research question. Focusing on stock option compensation expense, Hodge et al. (2004) examined the benefits of using search-facilitating software to analyze financial statements and footnotes. Our second task mirrors their stock option compensation expense setting, but does not investigate the benefits of using search-facilitating technology.

Participants began the experiment by clicking on a link embedded in an email. Participants then reviewed an instructions page, a page containing general information about the medical supplies industry, and a preview of questionnaire #1, which elicited the primary dependent variables. Participants began their firm-specific analysis by analyzing the financial statements and footnotes for two firms (Firm D and Firm R) in the medical equipment and supplies industry. Firm D discloses stock option compensation in the footnotes, while Firm R recognizes stock option compensation on the face of the income statement. Firm D outperforms Firm R on four key income statement ratios *unless* participants put the two firms on equal footing with respect to stock option reporting (i.e., by either adjusting Firm D's income statement to reflect stock option compensation or adjusting Firm R's income statement to not reflect stock option compensation). Thus, Firm D *appears* to outperform Firm R due to differences in financial reporting choices, rather than differences in underlying economics.

After examining each firm's financial information, participants computed four ratios for each firm, assessed each firm's financial performance, and made an investment decision. After submitting this questionnaire, participants completed a second questionnaire that contained manipulation check questions and gathered demographic information. The case concluded with the same 15-question financial literacy quiz used in experiment 1.

This task is relatively high in integrative complexity because participants who read and understand the footnotes will realize that the two firms differ in their accounting policy for stock options and that the pro forma earnings of Firm D disclosed in the notes are more comparable to the reported earnings of Firm R. When participants recognize this reporting discrepancy and adjust to put the two firms on equal footing, the materials are designed so that Firm R outperforms Firm D. In contrast, participants who do not integrate the information sufficiently well to recognize the reporting discrepancy should favor Firm D; the firm with the highest reported net income.

Participants

We recruited 155 early and select M.B.A. students from the same large state university from which we recruited participants for experiment 1. Experiment 2 was completed almost exactly one year prior to experiment 1; the early and select M.B.A. students in both experiments had covered approximately the same classroom material at the time of each experiment. One hundred twenty-four of the M.B.A. students are early students and 31 are

select students.[17] Our nonprofessional investor group consists of 58 individuals, 31 of whom also completed experiment 1. The demographics of our participants in this experiment are nearly identical to those in experiment 1.

Results

As with experiment 1, in experiment 2 we are not interested in measuring performance per se, but rather in examining whether early and select M.B.A. students acquire and integrate information similarly to nonprofessional investors such that any conclusions drawn from the analysis are the same regardless of participant type.

Acquisition

We investigate acquisition in three ways. First, we use tracking software to capture whether participants clicked on the footnotes when viewing the materials. Second, we ask participants whether they viewed the footnotes for Firm D and Firm R. Third, we ask participants to identify whether Firm D and Firm R disclosed or recognized stock option compensation information.

As shown in Panel A of Table 4, our tracking software recorded that 66 percent of the early M.B.A. students, 70 percent of the select M.B.A. students, and 67 percent of the investors clicked on the footnote information link in the experimental materials. Results reported in Panel B reveal that the percentages for early and select M.B.A. students do not significantly differ from the percentage for nonprofessional investors (all p-values ≥ 0.69). Results for our second acquisition measure also reveal that early M.B.A. students and select M.B.A. students acquired similar information to investors (all p-values $p \geq 0.23$).

Our third acquisition measure examines whether participants read and were able to recall whether Firm D and Firm R recognized on the face of the income statement or disclosed in the footnotes stock option compensation information. As shown in Panel A of Table 4, 42 percent (65 percent) of early (select) M.B.A. students correctly recall how each firm reported stock option compensation information, while 55 percent of investors correctly recall this information. Statistical tests in Panel B reveal that the investors performed marginally better than the early M.B.A. students ($p = 0.09$), but not significantly worse than the select M.B.A. students ($p = 0.39$), on this acquisition measure.

Integration

We first examine information integration by asking participants to assess financial statement reliability and management credibility for Firm D and Firm R. We are not interested in the magnitude of participants' responses, but rather whether the conclusions that a researcher would draw from using early or select M.B.A. students' responses would differ from the conclusions drawn from using actual nonprofessional investors' responses. When two firms are analyzed side by side, differences in their reporting choices are highlighted. Given that the FASB has consistently stated that recognition is the conceptually appropriate accounting method for stock option compensation, a decision by a firm's manager to disclose this information may raise questions about the reliability of the firm's financial statements and the credibility of the firm's management. Accordingly, we conjecture that participants who understand the implications of the two firms' reporting choices are likely to

[17] Twenty-six of our select M.B.A. students are from one university, and five are from another. GMAT (671 versus 673), work experience (5.3 years versus 5.1 years), and average GPA (3.40 versus 3.35) metrics are virtually identical across the two programs. Removing the five participants does not alter the significance of our statistical tests or our conclusions. We include them to increase the power of our tests.

TABLE 4
Experiment 2 Acquisition Variables

Panel A: Descriptive Statistics

Dependent Variable	Early M.B.A.[a] n ≈ 124	Investor n ≈ 58	Select M.B.A. n ≈ 31
1: Did participants view the firms' footnotes? (as recorded by tracking software)			
Both firms	66%	67%	70%
Only one firm or neither firm	34%	33%	30%
2: Did participants view the firm's footnotes? (as reported by participant)			
Both firms	71%	79%	84%
Only one firm or neither firm	29%	21%	16%
3: Did Firm D or Firm R include the cost of employee stock options in salary expense on the income statement?[b]			
Correct	42%	55%	65%
Incorrect	58%	45%	36%

Panel B: Planned Comparisons by Participant Group

Variable	Early vs. Investor	Select vs. Investor	Early vs. Select
1	$\chi^2 = 0.01$, $p = 0.90$	$\chi^2 = 0.07$, $p = 0.79$	$\chi^2 = 0.16$, $p = 0.69$
2	$\chi^2 = 1.42$, $p = 0.23$	$\chi^2 = 0.27$, $p = 0.60$	$\chi^2 = 2.12$, $p = 0.15$
3	$\chi^2 = 2.80$, $p = 0.09$	$\chi^2 = 0.73$, $p = 0.39$	$\chi^2 = 5.08$, $p = 0.02$

[a] Early M.B.A. students were midway through their core financial accounting class. Select M.B.A. students were second-year students taking a financial statement analysis elective class. Investors are individual investors who are members of the National Association of Investors Corporation.

[b] "Correct" is the percentage of participants who correctly answered that Firm D disclosed and Firm R recognized stock option compensation information.

rate the recognizing firm's financial statements as more reliable and the firm's management as more credible.

Our reliability and credibility questions for Firm D are related ($\alpha = .92$) as are the reliability and credibility questions for Firm R ($\alpha = .88$). We therefore only tabulate results using a simple-average composite measure.[18] We report descriptive statistics in Panel A of Table 5 and test for differences in Panel B. Results reveal that the composite measure for Firm R is greater than the composite measure for Firm D across all three participant groups (all p-values < 0.01). This suggests that early M.B.A. students, select M.B.A. students, and nonprofessional investors all assessed the implications of Firm D disclosing and Firm R recognizing stock option compensation information in a similar manner.

We further examine information integration by examining participants' financial performance judgments, a ratio adjustment variable, the percentage of participants who chose to invest all of their $10,000 in Firm B, and the percentage of $10,000 that participants elected to invest in Firm B when given the choice to split their investment choice between the two firms. We report descriptive statistics for these variables in Panel A of Table 5 and test for differences in Panels B and C.

Results reveal that early M.B.A. students and investors both judged the financial performance of Firm D to be greater than the financial performance of Firm R (all p-values ≤ 0.05). In contrast, select M.B.A. students judged the financial performance of the two firms to be similar ($p = 0.37$). The ratio adjustment variable is the number of participants in each participant group who adjusted compensation expense in their computation of a key ratio. The ratio was labeled the "human capital productivity ratio." The materials describe this ratio as "total sales/total employee compensation." Recall that if participants put the two firms on equal footing with respect to their reporting of stock option compensation expense, then Firm R dominates Firm D on this ratio. In analyzing this ratio, we categorize participants into those who made adjustments to put the two firms on equal footing and those who did not. As shown in Panel A of Table 5, only 17 percent of early M.B.A. students made adjustments to put the two firms on equal footing, while 33 percent of investors and 45 percent of select M.B.A. students did so. Statistical tests in Panel C show that the percentages of select M.B.A. students and investors who made adjustments to put the firms on equal footing do not differ ($p = 0.30$). In contrast, more investors than early M.B.A. students put the firms on equal footing ($p \leq 0.01$).

The first investment variable we examine is the percentage of participants who prefer to invest all of their $10,000 in Firm R. We expect participants who put the two firms on equal footing to be more likely to invest their $10,000 in Firm R than Firm D. As shown in Panel A of Table 5, 37 percent of investors and 42 percent of select M.B.A. students prefer to invest all of their $10,000 in Firm R, while only 19 percent of early M.B.A. students prefer to do so. As shown in Panel C of Table 5, early M.B.A. students' preference for Firm R is significantly less than investors' preference ($p = 0.01$). Select M.B.A. students' preference for Firm R does not differ from investors' preference ($p = 0.62$). Our second investment variable examines participants' investment decisions when they are allowed to allocate their investment dollars ($10,000) to both firms. As shown in Panel A of Table 5, investors allocate 40 percent of their investment to Firm R, compared to 36 percent for early M.B.A. students ($p = 0.32$) and 52 percent for select M.B.A. students ($p = 0.10$).

The above results are ambiguous with respect to whether early or select M.B.A. students integrate information similarly to investors in tasks that are relatively high in integrative

[18] Results are inferentially identical if we examine the reliability and credibility judgments separately.

TABLE 5
Experiment 2 Integration Variables

Panel A: Descriptive Statistics [mean (standard deviation)]

Dependent Variable		Early M.B.A.[a] n ≈ 124	Investor n ≈ 58	Select M.B.A. n ≈ 31
1: Reliability/Credibility Composite[b]				
	Firm D	7.4 (1.8)	6.3 (2.5)	6.6 (2.3)
	Firm R	8.1 (1.4)	7.7 (1.8)	8.1 (1.1)
2: Financial Performance[c]				
	Firm D	7.2 (2.0)	6.9 (2.5)	6.1 (2.7)
	Firm R	6.3 (1.7)	5.9 (1.8)	6.8 (2.2)
3: Percent who put Firm D and Firm R on equal footing[d]		17%	33%	45%
4: If you had to invest all $10,000 in one firm, which firm would you invest in?				
	Firm D	81%	63%	58%
	Firm R	19%	37%	42%
5: If you could invest in both firms, what percentage would you invest in each?				
	Firm D	64% (26%)	60% (33%)	48% (33%)
	Firm R	36% (26%)	40% (33%)	52% (33%)

Panel B: Paired Comparisons by Participant Group

Variable	Early M.B.A.	Investor	Select M.B.A.
1	$t = 4.30$, $p < 0.01$	$t = 4.22$, $p < 0.01$	$t = 3.71$, $p < 0.01$
2	$t = 4.38$, $p < 0.01$	$t = 2.08$, $p = 0.04$	$t = 0.92$, $p = 0.37$

Panel C: Planned Comparisons by Participant Group

Variable	Early vs. Investor	Select vs. Investor	Early vs. Select
3	$\chi^2 = 6.30$, $p = 0.01$	$\chi^2 = 1.22$, $p = 0.30$	$\chi^2 = 11.30$, $p < 0.01$
4	$\chi^2 = 6.31$, $p = 0.01$	$\chi^2 = 0.24$, $p = 0.62$	$\chi^2 = 6.82$, $p < 0.01$
5	$t = 0.99$, $p = 0.32$	$t = 1.67$, $p = 0.10$	$t = 2.57$, $p = 0.01$

(*continued on next page*)

TABLE 5 (Continued)

[a] Early M.B.A. students were midway through their core financial accounting class. Select M.B.A. students were second-year students taking a financial statement analysis elective class. Investors are individual investors who are members of the National Association of Investors Corporation.

[b] Our composite measure is the simple average of participants' responses to a reliability and a credibility question for Firm D (Firm R). Both questions are measured on 11-point scales. The reliability questions asked participants to respond to the following "I believe Firm D's (Firm R's) financial statements are _____," with endpoints labeled "not at all reliable" and "very reliable." The credibility questions asked participants to respond to the following "I believe Firm D's (Firm R's) management is _____," with endpoints labeled "not at all credible" and "very credible."

[c] We measured financial performance by asking participants to respond to the following on an 11-point scale "I believe Firm D's (Firm R's) financial performance for the year ended June 30, 2003 was _____," with endpoints labeled "very weak" and "very strong."

[d] This number represents the percentage of participants in each participant group who either adjusted Firm D's or Firm R's stock option compensation number to put the two firms on equal footing.

complexity. To shed additional light on this issue, we reran our integration tests using only participants who correctly answered our three acquisition measures. Doing so allows us to focus exclusively on information integration rather than a combined measure of acquisition and integration. The results reported in Table 6 are consistently stronger and reflect that the judgments and decisions of early (select) M.B.A. students tend to be dissimilar (similar) to those of investors.[19] Early M.B.A. students responded similarly to investors on only one (the reliability/credibility composite measure) of the five integration measures. In contrast, select M.B.A. students responded similarly on all five integration measures. These results suggest that once information is acquired, select M.B.A. students appear to integrate the information similarly to investors in tasks that are relatively high in integrative complexity. Early M.B.A. students do not.[20]

In the next section, we sort early M.B.A. students based on demographic characteristics to explore whether subsets of these individuals serve as good proxies for nonprofessional investors on tasks that are relatively high in integrative complexity, or tasks that are relatively low in integrative complexity and ask participants to make investment decisions.

V. EXPLORATORY ANALYSES

Examining Subsamples of Early M.B.A. Students

As discussed in Section II, Bonner and Lewis (1990) and Libby and Luft (1993) suggest that effort, experience, and knowledge differences might account for the integration differences we observe between early M.B.A. students and nonprofessional investors in experiments 1 and 2. To explore this possibility, we examine whether sorting early M.B.A. students on variables that proxy for effort, experience, and knowledge results in subsamples of students who are good proxies for nonprofessional investors performing tasks that are relatively low and relatively high in integrative complexity. In Panel A (experiment 1) and Panel B (experiment 2) of Table 7 we provide descriptive statistics for all three participant groups, but focus our analysis on early M.B.A. students since our previous results suggest that select M.B.A. students are already good proxies for nonprofessional investors regardless of a task's level of integrative complexity.

Our proxy for effort is the time participants took to complete the materials. Libby and Luft (1993, 433) propose that effort determines the degree to which available knowledge and abilities are brought to bear on a task. Descriptive statistics in Panel A and Panel B of Table 7 reveal that early M.B.A. students spent less time completing the experimental materials in both experiments. The experience variables we examine are investing experience, financial statement analysis experience, and work experience. As shown in Panels A and B of Table 7, early M.B.A. students have less investing experience, financial statement analysis experience, and work experience than investors. We consider the number of accounting and finance classes that early M.B.A. students have taken as well as their scores

[19] We modeled our task after the task used in Hodge et al. (2004). Their task was partially designed to test whether search-facilitating technology facilitates information acquisition. With this purpose in mind, they designed their task to make acquisition challenging. The difficulty of the acquisition task is reflected in the sample sizes we report in Table 6; only 33 early M.B.A. students passed all of the acquisition tests (27 percent), only 20 investors passed all of the acquisition tests (34 percent), and only 13 select M.B.A. students passed all of the acquisition tests (42 percent).

[20] Our experiment 2 integration results are inferentially identical using nonparametric tests.

TABLE 6
Experiment 2 Integration Variables for Participants Who Passed All Acquisition Tests

Panel A: Descriptive Statistics [mean (standard deviation)]

Dependent Variable		Early M.B.A.[a] n ≈ 33	Investor n ≈ 20	Select M.B.A. n ≈ 13
1: Reliability/Credibility Composite				
	Firm D	6.7 (2.0)	5.4 (2.7)	6.1 (2.4)
	Firm R	8.2 (1.1)	8.4 (1.2)	8.3 (1.0)
2: Financial Performance				
	Firm D	6.1 (2.6)	5.1 (2.5)	4.4 (2.5)
	Firm R	6.8 (1.7)	6.8 (1.8)	7.8 (1.9)
3: Percent who put Firm D and Firm R on equal footing		45%	70%	77%
4: If you had to invest all $10,000 in one firm, which firm would you invest in?				
	Firm D	55%	25%	23%
	Firm R	45%	75%	77%
5: If you could invest in both firms, what percentage would you invest in each?				
	Firm D	49% (34%)	30% (33%)	27% (28%)
	Firm R	51% (34%)	70% (33%)	73% (28%)

Panel B: Paired Comparisons by Participant Group

Variable	Early M.B.A.	Investor	Select M.B.A.
1	$t = 3.78$, $p < 0.01$	$t = 4.99$, $p < 0.01$	$t = 3.21$, $p < 0.01$
2	$t = 1.21$, $p = 0.24$	$t = 2.75$, $p = 0.01$	$t = 3.60$, $p < 0.01$

Panel C: Planned Comparisons by Participant Group

Variable	Early vs. Investor	Select vs. Investor	Early vs. Select
3	$\chi^2 = 3.03$, $p = 0.08$	$\chi^2 = 0.19$, $p = 0.66$	$\chi^2 = 3.72$, $p = 0.05$
4	$\chi^2 = 4.42$, $p = 0.03$	$\chi^2 = 0.01$, $p = 0.90$	$\chi^2 = 3.72$, $p = 0.05$
5	$t = 2.06$, $p = 0.04$	$t = 0.27$, $p = 0.79$	$t = 2.31$, $p = 0.03$

[a] See notes to Table 5.

TABLE 7
Experiment 1 and 2 Effort, Experience, and Knowledge Variables

Panel A: Effort, Experience, and Knowledge Variables

Dependent Variables
1: Minutes spent analyzing the materials and answering the first questionnaire
2: Have you ever bought or sold an individual company's common stock or debt securities (not through a mutual or pension fund)?
3: How many years have you been buying/selling individual equity or debt investments?
4: How many times have you evaluated a company's performance by analyzing its financial statements?
5: How many accounting and finance courses have you taken?
6: How many years of full-time work experience do you have?[b]
7: Financial literacy quiz (percent correct)[c]

Panel B: Experiment 1 Descriptive Statistics by Participant Group

	Early M.B.A.[a] n ≈ 82				Investor n ≈ 37				Select M.B.A. n ≈ 42			
Variable	**Mean**	**Median**	**Std. Dev.**	**Range**	**Mean**	**Median**	**Std. Dev.**	**Range**	**Mean**	**Median**	**Std. Dev.**	**Range**
1: (minutes)	13	13	5	5–31	17 minutes	15	7	5–32	14 minutes	14	6	5–30
2: "Yes"	52%				100%				69%			
2: "No"	48%				0%				31%			
3: (years)	2.9	2.0	4.1	0–25	13.9	10.0	13.0	1–50	3.9	3.0	4.1	0–15
4: "First time"	17%				3%				7%			
4: "1–5 times"	48%				20%				27%			
4: "6+ times"	35%				77%				66%			
5: "Accounting"	1.8	1.0	1.3	0–8	1.9	1.0	2.3	0–10	3.5	3.0	2.7	1–15
5: "Finance"	1.0	0.0	1.9	0–6	1.6	0.0	2.7	0–10	2.9	3.0	1.5	1–7
6: (years)	5.2	4.0	2.9	0–12	27.6	30.0	12.8	4–45	5.9	6.0	2.8	0–14
7: (% correct)	70%	67%	12%	47–93%	51%	60%	19%	0–80	71%	73%	16%	40–93

(*continued on next page*)

TABLE 7 (Continued)

Panel C: Experiment 2 Descriptive Statistics by Participant Group

	Early M.B.A.[a] n ≈ 124				Investor n ≈ 58				Select M.B.A. n ≈ 31			
Variable	**Mean**	**Median**	**Std. Dev.**	**Range**	**Mean**	**Median**	**Std. Dev.**	**Range**	**Mean**	**Median**	**Std. Dev.**	**Range**
1: (minutes)	31	26	18	10–155	39 minutes	40	17	5–138	32 minutes	22	30	6–143
2: "Yes"	52%				100%				68%			
2: "No"	48%				0%				32%			
3: (years)	2.6	0.3	3.9	0–20	11.6	10.0	10.4	1–50	2.0	0.0	2.4	0–7
4: "First time"	16%				7%				0%			
4: "1–5 times"	62%				33%				42%			
4: "6+ times"	22%				60%				58%			
5: "Accounting"	1.6	1.0	2.0	0–14	1.9	0.5	3.2	0–15	3.6	3.0	2.6	1–12
5: "Finance"	0.6	0.0	0.9	0–5	1.3	0.0	2.6	0–10	3.5	3.0	2.1	1–10
6: (years)	5.8	5.2	3.3	1–20	27.8	30.0	12.3	5–45	4.4	4.0	2.3	0–10
7: (% correct)	71%	73%	11%	40–93	51%	53%	16%	20–87	79%	80%	12%	47–93

[a] Early M.B.A. students were midway through their core financial accounting class. Select M.B.A. students were second-year students taking a financial statement analysis elective class. Investors are individual investors who are members of the National Association of Investors Corporation.

[b] In Experiment 2, we did not ask participants for years of work experience. Although this data is relatively easy to collect from M.B.A. students *ex post*, it is more difficult to collect from investors. Thus, we only have work experience data for the 32 investors who completed both experiments 1 and 2.

[c] Participants completed a 15-question financial literacy quiz. We report the average percentage of questions answered correctly by each participant group.

on a financial literacy quiz as proxies for general financial reporting knowledge.[21] Descriptive statistics reported in Panel A and B of Table 7 show that early M.B.A. students have taken approximately the same number of accounting/finance classes as nonprofessional investors, but scored higher on the financial literacy quiz.

Our exploratory analysis consists of splitting each of the above variables at the median and rerunning our integration tests in experiments 1 and 2 using only those early M.B.A. students who spent more time on the materials, have greater amounts of investing, financial statement analysis or work experience, have taken more accounting/finance classes, or performed worse on the financial literacy quiz. Results from this analysis (not tabled) fail to identify a subsample of early M.B.A. participants who integrate information similarly to nonprofessional investors across tasks that are relatively low (experiment 1) and relatively high (experiment 2) in integrative complexity.[22]

VI. DISCUSSION AND CONCLUSION

This paper investigates the assumption underlying much of the experimental research in financial accounting that graduate business students are a good proxy for nonprofessional investors. We investigate this assumption by using two experimental settings; one that is relatively low in integrative complexity and one that is relatively high in integrative complexity. Both levels of integrative complexity are common in prior studies in the accounting literature. We test for differences between M.B.A. students and nonprofessional investors in the components of integrative complexity, information acquisition and information integration, to determine if using M.B.A. students as proxies for investors informs us about the likely behavior of nonprofessional investors.

Our results reveal that M.B.A. students who have completed the first year of an M.B.A. program and have elected to take a financial statement analysis course (select M.B.A. students) are good proxies for nonprofessional investors in tasks that are relatively low in integrative complexity. Though less definitive, the majority of our tests also suggest that select M.B.A. students are a good proxy for nonprofessional investors in tasks that are relatively high in integrative complexity. In tasks that are relatively low in integrative complexity, M.B.A. students who are midway through a core financial accounting course in the first year of the M.B.A. program (early M.B.A. students) acquire and integrate information similarly to nonprofessional investors except when they are asked to make an investment decision. For tasks that are relatively high in integrative complexity, early M.B.A. students acquire information similarly to nonprofessional investors, but they do not appear to integrate the information in a similar manner. Thus, for tasks that are relatively high in integrative complexity, we recommend that researchers recruit select M.B.A. students when actual nonprofessional investors are not available.

Like all research, our study is subject to several limitations. First, we did not test for knowledge differences in specific subtopics of financial accounting or in other areas that might be important in making good investment decisions (e.g., industry-specific knowledge or forecasting knowledge). Given that we observe differences between M.B.A. students and

[21] General financial reporting knowledge is a broad concept encompassing many subconstructs. Thus, similar to Bonner and Walker (1994) and Shankar and Tan (2006), we do not report an overall reliability measure for our literacy quiz. An alternate approach would be to compute a reliability measure for each subconstruct. Given length and time constraints, however, we chose to include only a few questions pertaining to any individual subconstruct and are therefore unable to compute subconstruct reliability measures.

[22] We recognize that our median-split exploratory analysis has limitations. We conduct this analysis because of the considerable overlap in the distributions of early M.B.A. students' and investors' effort, experience, and knowledge measures (see Panels B and C of Table 7).

nonprofessional investors on some of our variables, future research could further explore the various dimensions that differ between these groups. Our exploratory analysis was unable to identify key effort, knowledge, or experience metrics, that when sorted on, allow early M.B.A. students to perform similarly to investors.

Second, our analysis incorporated two financial reporting tasks: one that is relatively low in integrative complexity and one that is relatively high in integrative complexity. We expect our settings to be representative of other financial reporting differences between firms. The extent to which they are not limits the generalizability of our findings. Third, our nonprofessional investors may not represent the entire cross-section of nonprofessional investors. We believe, however, that our nonprofessional investors meet the FASB's criteria that nonprofessional investors ''have a reasonable understanding of business and economic activities and are willing to study the information with reasonable diligence'' (FASB 1978). Notwithstanding these limitations, our study provides evidence to researchers, regulators, and standard setters that using M.B.A. students as a proxy for nonprofessional investors is a valid methodological choice, as long as researchers give careful consideration to aligning a task's level of integrative complexity with the appropriate level of M.B.A. student.

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