An interactive approach to teaching WACC concepts in an introductory finance class

Anne Drougas
Dominican University

Richard Walstra
Dominican University

Steve Harrington
Dominican University

ABSTRACT

Within the introductory finance course, students learn that a financial manager needs to increase the intrinsic value of his/her firm and that the value is derived from the present value of the firm's expected future cash flows, discounted by the weighted average cost of capital (WACC). The WACC equation represents a critical component for several topics within the introductory class such as time value of money and capital budgeting. Instructor coverage of WACC should highlight the formula's link to accounting by drawing data from financial statement information. Because practitioners apply WACC in several different ways, coverage should also address issues such as the Capital Asset Pricing Model, the dividend growth model, and the effect of book and market value inputs. Because of time constraints within the introductory course, finance professors must consider the appropriate pedagogical style to use for effectively teaching WACC. This paper describes a technology-based assignment intended to instill in students a strong grasp of WACC concepts.

Keywords: Business education, active learning, weighted average cost of capital

INTRODUCTION AND LITERATURE REVIEW

Teaching introductory finance is a challenge, even for experienced instructors (Biktimirov & Nilson, 2003). Part of the challenge relates to instructing general business majors who might not see the relevancy of the finance course nor easily grasp the concepts (Hess, 2005). The course is vital, however, in that it builds upon its prerequisite, financial accounting (McWilliams & Peters, 2012), and affords the non-finance major an opportunity, perhaps one of few curricular opportunities, to meaningfully link financial statement information with managerial decision-making. Although finance majors are more likely to understand the relevancy of the introductory course's topical coverage, the course further challenges faculty to identify teaching tools that engage students in an active learning process. Brown (2005) proposed that active learning involves a new paradigm based on understanding and discovery versus memorization and recall. Students are visual learners (Baker & Post, 2006) who prefer assignments that clearly communicate the relevance of topics, such as finance, within the workplace (Bale & Dudney, 2000). As Biktimirov and Nilson (2003) suggest, finance educators need an "arsenal" of teaching tools at their disposal to develop student-centric assignments that engage students at a level "appropriate" for the curriculum and course objectives (Hamilton & Saunders, 2009).

Regarding topical coverage in the introductory finance class, seminal studies by Berry and Farragher (1987) and Cooley and Heck (1996) surveyed finance professors and the results demonstrated an emphasis on cost of capital. The Berry and Farragher survey, for example, identified cost of capital/capital structure as one of the three primary topics at both the undergraduate and graduate level, and within that area, WACC was the principal sub-topic. Surveys by Gup (1994) and Lai, Kwan, Kadir, Abdullah and Yap (2010) disclosed that practitioners also placed a high value on cost of capital. Student surveys have echoed these results (Krishnan, Bathala, Bhattacharya, & Richie, 1999; Balachandran, Skully, Tant, & Watson, 2006; Lai, et al., 2010).

The concept of WACC is central to the field of finance and pervades many other topics; however, finance professors must balance their coverage of WACC with other priorities. The sheer volume of material available within an introductory finance textbook can make course design extremely difficult. As an example, a review of the twenty-one chapters of a popular finance textbook (Brigham & Houston, 2013) reveals the scope of the challenge. Early chapters address core topics such as time value of money, risk analysis, and valuation. Additional chapters explore other finance topics including cost of capital and capital structure. Relative to cost of capital, faculty must decide when to introduce the concept and to what degree of detail. Early on, many instructors might simply incorporate an assumed rate. Others might elect to carefully guide students through the components of the WACC calculation. Additionally, faculty must determine the extent to which they will challenge students to use detailed financial statements as a source for cost of capital data. In a review of finance textbooks, McWilliams and Peters (2012) found little integration of financial statement information.

The assignment described below presents a student-centric approach to teaching the topic of WACC within the introductory finance class. By incorporating an interactive Excel worksheet, instructors can (1) develop student knowledge of the WACC formula and the factors that affect WACC, (2) reinforce the importance of financial statements, and (3) create a "bridge" between topics generally covered earlier in the course (e.g., bond and stock valuation) with those covered nearer to the end (e.g., capital budgeting, cash flow and risk estimation). The assignment helps students discover how elements of the financial statements drive WACC and allows them

to explore how changes to the various components of the formula will affect WACC. By gaining an understanding of the intricacies of WACC, students are better prepared to move on to more advanced finance topics.

The financial educator's charge: Emphasizing student-centered learning

Saunders (2001) called for greater use of multiple teaching methods and assessment techniques within the introductory finance course. In a national survey, Saunders discovered that the majority of finance professors relied heavily on traditional lecture and in-class testing as a way to deliver key material. Hamilton and Saunders (2009) updated this survey and found no difference in teaching strategies within the introductory finance course. The typical finance educator (1) used the Brigham and Houston (concise) text or some version of the Brigham series, (2) utilized financial calculators (undergraduate) and formulas (graduate) to solve financial problems, and (3) relied on in-class testing as a major determinant for a student's final grade. The authors acknowledged the efforts of finance educators who have attempted to engage students within the introductory finance class through the implementation of case studies (Nunnally & Evans, 2003), team projects (Faulk & Smolira, 2008), spreadsheet tools (Hallows, 2008), instant messaging (Michelson & Smith, 2008), and podcasting (Reimers & Singleton, 2008). However, these pedagogies appear to represent exceptions to the rule.

A review of the literature on student learning offers many calls for student-centered learning. Angelo (1993) encouraged an active, interactive process. Citing the work of Angelo, Ardalan (2006) stated "understanding learning styles helps to improve teaching performance and enhance student learning" (p. 3). Ardalan believed finance faculty should use diverse teaching strategies to engage all students. Barr and Tagg (1995) advocated movement away from a lecture-driven "instructor paradigm" to a "learning paradigm" encompassing a variety of teaching and assessment techniques. This becomes particularly important when educating the current generation of college students, often referred to as the Net Generation (Net Gen) whose members have been described as high achievers, technically adept, and multi-taskers with a need to explore (Windham, 2005). If financial educators are to reach these students, they must first understand them and then adapt teaching methodologies to suit them. "The Net Gen is oriented toward inductive discovery or making observations, formulating hypotheses, and figuring out the rules. They crave interactivity" (Oblinger & Oblinger, 2005, p. 2.7).

Finance faculty can build an interactive finance course suitable for the Net Gens by incorporating technology. Faculty have used technology in a number of different ways (Saunders, 2001); however, they have not always done so successfully (Cudd, Lipscomb, & Tanner, 2003). Cudd, Lipscomb, and Tanner claim "spreadsheet analysis is the primary tool of the financial manager" (p. 246) and the tech-savvy Net Gen prefer to learn by doing (McNeely, 2005). Technology, therefore, can bridge students' abilities with industry's needs. As McNeely states, "by using IT properly in the classroom, teaching and learning are enhanced and given a new dimension" (p.4.2). The Association to Advance Collegiate Schools of Business (AACSB) has also emphasized the importance of technology. In its 2002 report by the Management Education Task Force, AACSB encouraged instructors to equip students to make better business decisions utilizing technology (McWilliams & Peters, 2012).

Recent efforts by Villanova University to answer AACSB's call for curriculum change have reiterated the importance and need to incorporate financial statements within the finance curriculum. The university created a six-credit hour course integrating the introductory financial

accounting and introductory finance courses. Financial statements were a prevalent theme throughout the course (McWilliams & Peters, 2012). After conducting an extensive review of the popular textbooks in finance, McWilliams and Peters discovered that many introductory finance texts use "skeletal financial statements without actual integration or derivation of numbers in financial statements" (p. 312). Furthermore, the authors suggested that many finance topics, including the cost of capital, should be taught with a more explicit focus upon financial statements.

The financial educator's charge: Highlighting relevancy of financial applications

In addition to the challenge finance educators face in developing an active, engaging learning environment, they must focus the learning around topics that are relevant within the finance profession. Sometimes, topics emphasized by financial educators are different than topics deemed important by practitioners. For example, Lai, et al. (2010) investigated the practitioner perspective and discovered that CEOs place a higher value on accounting and cost of capital factors than finance professors. The two primary topics are time value of money (TVM) and capital budgeting. Current research highlights papers with a student-centric focus pertaining to both TVM (e.g., Bianco, Nelson & Poole, 2010) and capital budgeting (Ben-Horin & Kroll, 2010). The cost of capital, however defined or measured, underpins both calculations.

In light of the importance of cost of capital from a practitioner's perspective, increasing coverage of WACC within the finance curricula will better prepare students for the workplace. For example, Pagano and Stout (2004) considered the cost of capital to be fundamental to the work of finance and accounting professionals and they identified several uses for the tool. In addition, Adelman and Cross (2005) also highlighted the breadth of applications including its use by courts and regulators for rate setting in industries such as insurance and utilities. In both papers, WACC was presumed to be the formula for the cost of capital. Lastly, Truong, Partington, and Peat (2008) conducted a practitioner survey and their findings showed firms used cost of capital 88% of the time for evaluation techniques while 84% of the respondents indicated they developed an estimate of WACC.

As students gain an appreciation of the cost of capital and learn to calculate WACC, they must recognize the purpose of WACC as a rate of return used for valuing a stream of expected cash flows. Students need to appreciate how the discount rate drives both capital budgeting decisions and the TVM. Additionally, students must understand that value creation within an organization hinges on capital investment returns exceeding the cost of capital.

FEATURES OF THE WACC SPREADSHEET

The spreadsheet assignment provides an interactive approach to the topic of WACC within the introductory finance course. An electronic copy of the spreadsheet can be obtained from the lead author upon request. The instructor begins the process by reviewing the WACC equation with students during class. Next, the instructor describes the spreadsheet students will use to explore the components of WACC. The starting point for the assignment is a set of condensed financial statements for a fictitious company. The financial data emphasizes the debt and equity components within the statements. The pre-formatted spreadsheet includes embedded macros and VBA-coded control buttons that guide students in a step-by-step fashion through the various factors that influence WACC. The spreadsheet minimizes the need for mathematical

calculation of WACC by incorporating spinner buttons ("spinners"). These buttons allow students to study how changes in one or more variables within the WACC equation impact the magnitude and direction of WACC. Because students do not need to perform calculations or gather information, they are able to focus on expanding their knowledge of the WACC formula and recognizing several factors that influence WACC.

The spreadsheet consists of three exhibits. Exhibit 1A allows students to become familiar with the financial statement and market data that drive the WACC calculation. The exhibit highlights the differences between book and market values since both valuations are used by practitioners in the determination of WACC (Truong, Partington, & Peat, 2008). Exhibit 2A builds on the previous exhibit by reflecting cost of debt on a pre-tax and post-tax basis and presenting the cost of equity under the CAPM and dividend-growth (DIV) models. Exhibit 3A gives students the opportunity, through the use of spinners, to make changes to the base factors that affect the cost of debt and the cost of equity under both the CAPM and DIV models. Students can also modify the strategic mix of debt and equity. Further detail on the features of the exhibits follows:

Exhibit 1A and Exhibit 1B: Weights of debt (w_D) and equity (w_E)

As indicated in Exhibit 1A (Appendix), the spreadsheet contains financial statement information with embedded macro buttons, prompting students to calculate the book value weights and market value weights of debt and equity, respectively. As indicated in Exhibit 1B (Appendix), the macro buttons trigger book value calculations, market value calculations, and a summary table for w_D and w_E, respectively. The color-coded cells within the spreadsheet help students identify the source for each calculation. Within this first worksheet, all students have a common starting point for WACC calculations as they tie WACC back to financial statement analysis. Instructors may wish to prompt students to consider how a change in a firm's stock price or the number of shares outstanding impacts w_D and w_E.

Exhibit 2A and Exhibit 2B: The cost of debt (r_D) and the cost of equity (r_E)

As indicated in Exhibit 2A (Appendix), students click a control button to carry forward relevant financial statement information from the first worksheet (see Exhibits 1A and 1B) to the second worksheet. The summary schedule presented in Exhibit 2A reminds students of the importance of interest expense, dividends, and other key financial statement items necessary for completing the WACC calculation. As students begin to click the sequence of macro buttons, they can track the calculations for r_D, r_E, and WACC (see Exhibit 2B).

When students activate the r_D calculation via the embedded macro button, they can visualize the importance of average debt, income tax expense, and income (before taxes) in deriving r_D (Morrison Analytics, 2012). Also, Exhibit 2B presents students with two different methods for calculating r_E. As students click the final macro button, the spreadsheet reveals a summary table for WACC using both the CAPM method (WACC-CAPM) and the dividend growth model (WACC-DIV). Students can identify how the method used to derive r_E impacts WACC.

Exhibit 3A and Exhibit 3B: Computing variations to WACC ($w_D r_D(1-t) + w_E r_E$)

As indicated in Exhibit 3A (Appendix), students click a control button to carry forward r_D and r_E from the second worksheet and redisplay the WACC calculations. The starting point for the spinners aligns the original inputs and the solutions from Exhibit 2B. Students should readily recognize that the WACC calculation they explored through the previous worksheet matches the WACC calculation derived via the spinners. Next, students use the spinners to identify how changes in one or more variables impact the output. Initially, the spinners reflect the base case as presented in earlier exhibits. Using the spinners, students can observe, for example, that a decline in the tax rate leads to an increase in r_D and an increase in WACC, or that an increase in a company's beta leads to an increase in r_E and an increase in WACC. In addition, students may note that a change in dividends would only impact WACC-DIV. At any point, students can click the "clear all" button to return to the summary table of results.

OPPORTUNITIES IN TEACHING WACC

Krishnan, et al. (1999) considered the scope of material available for the introductory finance class and suggested it "would be impossible to do justice to all topics in a one-semester course" (p. 80) and recommended "keeping coverage practical and simple" (p. 81). According to Parrott (2009), WACC appears to be a straightforward concept and faculty might be tempted to limit coverage through a streamlined approach. However, the WACC equation plays a pivotal role in the introductory course and detailed coverage of the topic through an interactive spreadsheet serves several purposes.

Create a bridge between introductory finance topics

Highlighting WACC serves as a bridge between multiple topics within the course. Faculty will have covered TVM early in the introductory course, and a study of WACC reinforces its central role for discounting cash flows. In TVM analysis, students learned how to use the present value tool to assess projects. Students can now learn how and why WACC represents an appropriate discount rate. Later in the course, faculty typically cover capital budgeting through which students learn to calculate net present value (NPV) under various scenarios. By understanding what drives changes in WACC, students begin to appreciate the effect on NPV. The WACC formula also reinforces the dividend growth model developed in the finance course's stock valuation material. If faculty decide to engage students in a review of capital structure theory, knowledge of WACC supports their understanding of operating income (EBIT), interest expense, and leverage.

Students appreciate "boundary-spanning business thinking" (AACSB, 2002, p. 20). Instructors could choose to briefly discuss applications of WACC in other fields, such as the mutual insurance industry (Adelman & Cross, 2005) or the hospitality industry (Jung, 2007). This may promote relevance to the general business major. Instructors can expose students to excerpts from Fama and French (1992) and a study by Truong, Partington, and Peat (2008) which identify how practitioners apply WACC to solve business problems. From the Truong et al. survey, students learn that WACC is "widely used" (p. 98) as a discount rate. They also learn that 60% of practitioners use expected weightings of debt and equity to calculate WACC, 51% use the market value of financial instruments, and 69% adjust for the interest rate shield on debt.

Finally, instructors can emphasize the role of CAPM within the WACC equation and how academics struggle to derive a good estimate for the market rate of return (Rogers, 2009). Brigham (as cited in Gup, 1994) stated students must understand "the CAPM in the real world does not produce neat, precise answers" (p. 108). Carrithers, Ling, and Bean (2008) argued against well-structured problems with right answers and instead advocated ill-structured or "messy" problems that teach critical thinking skills. Given the breadth of cost of capital applications by practitioners, students benefit by exploring a full range of concepts rather than solving for a single solution to WACC.

Clarify the importance of the discount rate

Introductory finance textbooks typically provide the rate used to discount cash flows within TVM and capital budgeting problems. After performing numerous present value calculations, students might be left with the impression that the associated discount rate is always given or that a single, "correct" rate exists. Exploring WACC provides instructors with an opportunity to clarify the importance of discount rates and present the detail embedded in the WACC formula. Similarly, exploring WACC allows students to connect the rate used for discounting with a financial manager's debt-equity decisions.

Highlight financial relationships

Coverage of the WACC formula gives instructors the opportunity to (1) introduce students to balance sheet and income statement information, (2) highlight differences between book and market values, and (3) illustrate how managers extract relevant data from financial statements for decision-making purposes.

THE ASSIGNMENT

By emphasizing the relationship between financial statement items and WACC, this assignment forces a student to assume the role of a financial manager and consider how a change in various factors might impact WACC. Because the spreadsheet reveals calculations in a step-by-step fashion, students can spend time reflecting on the significance of their findings rather than becoming frustrated or lost in a myriad of calculations.

The assignment consists of two sections. In the first section, students begin with a WACC-CAPM of approximately 8% (i.e., the base case) and use spinners to explore how increases and decreases in CAPM variables impact WACC. In the second section, students begin with a WACC-DIV of approximately 8% and again use spinners to explore how changes in dividend growth model variables impact WACC. To complete the assignment, students prepare a written report on their findings. The instructor can also follow up with a classroom discussion of student results. The specific assignment steps are presented below:

Section I: Calculating WACC using CAPM (WACC-CAPM)

1. The CFO anticipates that WACC (based upon the CAPM method) will increase from the rate presented in the base case (approximately 8%) to approximately 20% next year. Factors which may impact WACC-CAPM next year include:
    a. The cost of debt (r_D)

   b. The corporate tax rate (T_C)
   c. The risk-free rate (r_{RF})
   d. The market risk (β)
   e. The market rate of return (r_M)

   Using spinners, adjust each of the aforementioned factors and briefly comment on how they impact WACC-CAPM.
2. Returning to the base case with the "Clear All" button, minimize and maximize one of the aforementioned factors and comment on the effect of that variable on WACC-CAPM.
3. Returning to the base case, minimize and maximize a different factor. Comment on the sensitivity of that variable on WACC-CAPM.

Section II: Calculating WACC using the dividend growth model (WACC-DIV)

1. The CFO anticipates that WACC (based upon the dividend growth model) will increase from the rate presented in the base case (approximately 8%) to approximately 20% next year. Factors which may impact WACC-DIV next year may include:
   a. The cost of debt (r_D)
   b. The corporate tax rate (T_C)
   c. The dividend rate
   d. Current stock price (P)
   e. Growth rate in dividends (g)

   Using spinners, adjust each of the aforementioned factors and briefly comment on how they impact WACC-DIV.
2. Returning to the base case with the "Clear All" button, minimize and maximize one of the aforementioned factors and comment on the effect of that variable on WACC-DIV. Returning to the base case, minimize and maximize a different factor. Comment on the sensitivity of that variable on WACC-DIV.

SAMPLE STUDENT RESULTS

To assess student understanding of WACC, the instructor distributed the spreadsheet to students within a small introductory finance class. Prior to its distribution, the instructor motivated students by dedicating class time to the importance of the discount rate within the bond and stock valuation models developed earlier in the course. In addition, the instructor emphasized the importance of WACC to future topics such as capital budgeting, cash flow and risk analysis, and valuation-based management models (i.e., adjusted present valuation techniques). The students were provided one week to complete the assignment. The student deliverables included electronic submittal of spreadsheet results to the instructor and a brief narrative of their findings.

Student commentaries signaled a level of discomfort with WACC concepts. Although students correctly identified which factors directly (e.g., r_M) and inversely (e.g., stock prices) impacted WACC, the typical student response only highlighted numerical relationships (e.g., if r_M increased by 1%, then WACC-CAPM increased by 0.5%). Exhibit 4 (Appendix) presents sample student results.

Section I: Student Results (WACC-CAPM)

Student results suggested proficiency in adjusting CAPM variables to achieve an increase in WACC from roughly 8% to 20%. Students noted the tax rate plays a fundamental role in the cost of debt calculation. More specifically, many recognized interest expense is tax deductible on bonds and that as the tax rate increases, debt becomes less costly, and WACC-CAPM falls.

Using the spinners, students noticed little change in WACC due to risk-free rate (r_{RF}) adjustments. One student noted that r_{RF} reflects the return on "the least risky investment one can find in the market, usually expressed as the return on Treasury bonds." Within his commentary, the student suggested Treasury rates set the economy's floor for interest rates and that changes do not necessarily change the market risk premium. He further suggested that during a recession, firms reduce spending. This, in turn, will lower r_{RF} and r_M together, keeping the market risk premium stable.

A third student noted that a "high" beta (greater than 1.0) implies a firm's stock adds more risk to a well-diversified portfolio. The student noted the higher the beta, the higher the required return for investors, leading to a higher WACC-CAPM.

When describing WACC-CAPM, students recognized that CAPM is more than just abstract theory presented in the chapter preceding WACC. Students gained insight into how CAPM could be used by analysts and how changing the inputs impact the WACC calculation. For example, Brigham and Houston (2013) indicated that the value used to represent r_M can have a significant effect on the calculated beta.

Section II: Student Results (WACC-DIV)

Regarding WACC-DIV, students recognized that a financial manager's decision to increase dividends leads to a higher cost of equity. Students also recognized that a higher stock price implied that the dividend yield (D_1/P) would fall, everything else equal, placing downward pressure on WACC-DIV.

When students attempted to minimize and maximize variables simultaneously, their comments reinforced their lack of comfort with the WACC equation. Exploring WACC through an interactive worksheet provided students with a view of its complexities. Students surmised that if a financial manager increases the proportion of debt, then the weight of low-cost debt (w_D) increases and the weight of high-cost equity (w_E) falls. However, after the instructor collected the assignment and asked for student feedback, students were tentative in acknowledging that changing the capital structure impacts all variables in the WACC equation.

Student Review

After distributing results to the students, the instructor asked them to participate in a 15-minute discussion about the assignment before proceeding to capital budgeting. Students observed that while the WACC formula is fairly straightforward, the spreadsheet provoked them to comment on relationships between key components and WACC. One student commented, "This spreadsheet forces a student to think like a financial manager and what happens to WACC if a recession occurs and r_M falls." Another student indicated that instead of busily solving equations via Excel or a financial calculator, he gained an appreciation for complicated cost of capital issues that managers might face in the boardroom.

During this exercise, students recognized that the cost of capital is affected by factors that are outside of a firm's control. These include stock prices, the market risk premium, and tax rates set by Congress (Brigham & Houston, 2013). Students also recognized that a firm can exercise control over internal factors such as its capital structure and its dividend policy.

CONCLUSION AND FUTURE RECOMMENDATIONS

Hamilton and Saunders (2009) called for more student-centric learning activities at a level appropriate to a university's curriculum and course objectives. Such activities should assist students in developing the decision-making skills needed in the workplace and engage students in the learning (and application) of finance concepts regardless of a student's major. Through an interactive, exploratory process, this assignment represents a step in that direction. In the assignment, an Excel spreadsheet serves as a "bridge" between the bond and stock valuation chapters using TVM and chapters culminating the introductory course (e.g., capital budgeting, cash flow estimation). The spreadsheet provides a sequential approach for calculating WACC which is appropriate for the Net Gen student. Through the use of spinners, students can witness how incremental changes in various factors impact WACC. By deemphasizing WACC calculations in favor of testing the effect of changes in the formula, the spreadsheet encourages students to identify directional relationships. The assignment presents instructors with an opportunity to develop student knowledge and appreciation of WACC without a significant commitment of class time.

Future extensions to the WACC assignment include the following:

1. Present financial statements for a firm with multiple divisions and ask students to calculate and compare divisional WACCs.
2. Include preferred stock within the calculation.
3. Require students to research financial statements for a firm and import key components (i.e., r_{RF}, r_M) using reputable sources.
4. Require students to use financial statements and spinners to illustrate the trade-off theory.
5. Alter the assignment so that students derive the WACC curve under various levels of debt and identify the point at which a firm maximizes its value by minimizing WACC.

REFERENCES

American Assembly of Collegiate Schools of Business (AACSB). (2002). *Management Education at Risk.* Report of the Management Education Task Force. Retrieved May 1, 2012 from http://www.gfme.org/issues/pdfs/Management%20Educaton20at%20Risk.pdf.

Adelman, S., & Cross, M. (2005). Calculating the weighted average cost of capital for a mutual insurance company. *Corporate Finance Review*, *9(4)*, 19-28.

Angelo, T. (1993). A teacher's dozen: Fourteen general, research-based principles for improving higher learning in our classrooms. *AAHE Bulletin*, 3-13.

Ardalan, K. (2006). Learning styles and the use of the Wall Street Journal in introductory finance courses. *Academy of Educational Leadership Journal*, *10(2)*, 1-21.

Balachandran, B., Skully, M., Tant, K., & Watson, J. (2006). Australian evidence on student expectations and perceptions of introductory business finance. *Accounting and Finance*, *46*, 697-713.

Bale, J.M., & Dudney, D. (2000). Teaching Generation X: Do andragogical learning principles apply to undergraduate finance education. *Financial Practice and Education*, *10(1)*, 216-227.

Baker, H., & Post, D. (2006). Bringing financial analysis into the classroom: The Kogod equity research and analysis (KERA) project. *Journal of Financial Education*, *32(4)*, 32-42.

Barr, R.B., & Tagg, J. (1995). From teaching to learning – A new paradigm for undergraduate education. *Change*, *27(6)*, 13-25.

Ben-Horin, M., & Kroll, Y. (2010). IRR, NPV, and PI ranking: Reconciliation. *Advances in Financial Education*, *8(2)*, 88-105.

Berry, T.D., & Farragher E.J. (1987). A Survey of Introductory Financial Management Courses, *Journal of Financial Education*, *Fall*, 65-72.

Bianco, C., Nelson, D., & Poole, B. (2010). Teaching time value of money. *The Business Review, Cambridge*, *16(1)*, 25-31.

Biktimirov, E., & Nilson, L. (2003). Mapping your course: Designing a graphic syllabus for introductory finance. *Journal of Education for Business*, *78(6)*, 308-312.

Brigham, E.F., & Houston, J.F. (2013). *Fundamentals of Financial Management*, 7th Edition. Mason, OH: South-Western Cengage Learning.

Brown, M. (2005). Learning spaces. In D. Oblinger and J. Oblinger (Eds.), *Educating the Net Generation* (pp. 12.1-12.22). Washington D.C.: Educause.

Carrithers, D., Ling, T., & Bean, J. (2008). Messy problems and lay audiences: Teaching critical thinking within the finance curriculum. *Business Communication Quarterly*, *71(2),* 152-170.

Cooley, P.L., & Heck, J.L. (1996). Establishing benchmarks for teaching the undergraduate introductory course in financial management. *Journal of Financial Education*, *Fall*, 1-10.

Cudd, M., Lipscomb, T., & Tanner J. (2003). Technology in the classroom: An assessment of hardware and software use in finance instruction. *Journal of Education for Business*, *78(5)*, 244 – 248.

Fama, E., & French, K. (1992). The cross-section of expected stock returns. *Journal of Finance*, *47*, 427-65.

Faulk, G., & Smolira, J. (2008). Implementing a comprehensive corporate project in an introductory finance class. *Journal of Financial Education*, *33(3)*, 74-87.

Gup, B.E. (1994). The five most important finance concepts: A summary. *Financial Practice and Education*, *4(2)*, 106-109.

Hallows, K. (2008). Evaluating the instructional methodology focus for teaching the introductory finance course (conceptual vs. spreadsheet tool – which is best?). *Academy of Business Education Financial Education Association Annual Proceedings*, 9.

Hamilton, J., & Saunders, K. (2009). An update of teaching methods and evaluation in the introductory finance classroom. *Advances in Financial Education*, *7(Summer)*, 86-100.

Hess, D. (2005). An investments course project using online financial information and analytical tools. *Advances in Financial Education, Fall*, 40-54.

Jung, H. (2007). WACC as the touchstone performance indicator: The use of financial ratios as performance indicator - from operations to capital investments. *International Journal of Contemporary Hospitality Management*, *20(6)*, 700-710.

Krishnan, V., Bathala, C., Bhattacharya, T.K., & Ritchey, R. (1999). Teaching in the introductory finance course: What can we learn from student perceptions and expectations? *Financial Practice and Education*, *9 (Spring/Summer)*, 70-82.

Lai, M., Kwan, J., Kadir, H., Abdullah, M., & Yap, V. (2010). Effectiveness, teaching, and assessments: Survey evidence from finance courses. *Journal of Education for Business, 85(1)*, 21-29.

McNeely, B. (2005). Using technology as a learning tool, not just the cool new thing. In D. Oblinger and J. Oblinger (Eds.), *Educating the Net Generation* (pp. 4.1-4.10). Washington D.C.: Educause.

McWilliams, V., & Peters, M. (2012). An integrated approach to beginning financial accounting and finance courses. *Issues in Accounting Education*, *27(1)*, 299-336.

Michelson, S., & Smith, S. (2008). Using instant messenger in the finance course. *Managerial Finance*, *34(2)*, 131-138.

Morrison Analytics (2012). Business Automation. Retrieved May 15, 2012 from http://www.morrisonanalytics.com/offerings/bus_automation.php.

Nunnally, B., & Evans, M. (2003). Case teaching and the integrative process. *Journal of Financial Education, 25(Fall)*, 37-49.

Oblinger, D., and Oblinger, J. (2005). Is it age or IT: First steps toward understanding the Net Generation. In D. Oblinger and J. Oblinger (Eds.), *Educating the Net Generation* (pp. 2.1-2.20). Washington D.C.: Educause.

Pagano, M., & Stout, D. (2004). Calculating a firm's cost of capital. *Management Accounting Quarterly*, *5(3)*, 13–20.

Parrott, W. (2009). Management accounting – financial strategy. *Financial Management*, 44-46.

Reimers, J., & Singleton, J.C. (2008). Podcasting finance classes: Some early experiences. *Journal of Financial Education*, *34(Spring)*, 128-136.

Rogers, D. (2009).Valuation Handbook: Valuation Techniques from Today's Top Practitioners: Book Review. *Journal of Applied Finance*, *19(1)*, 217-220.

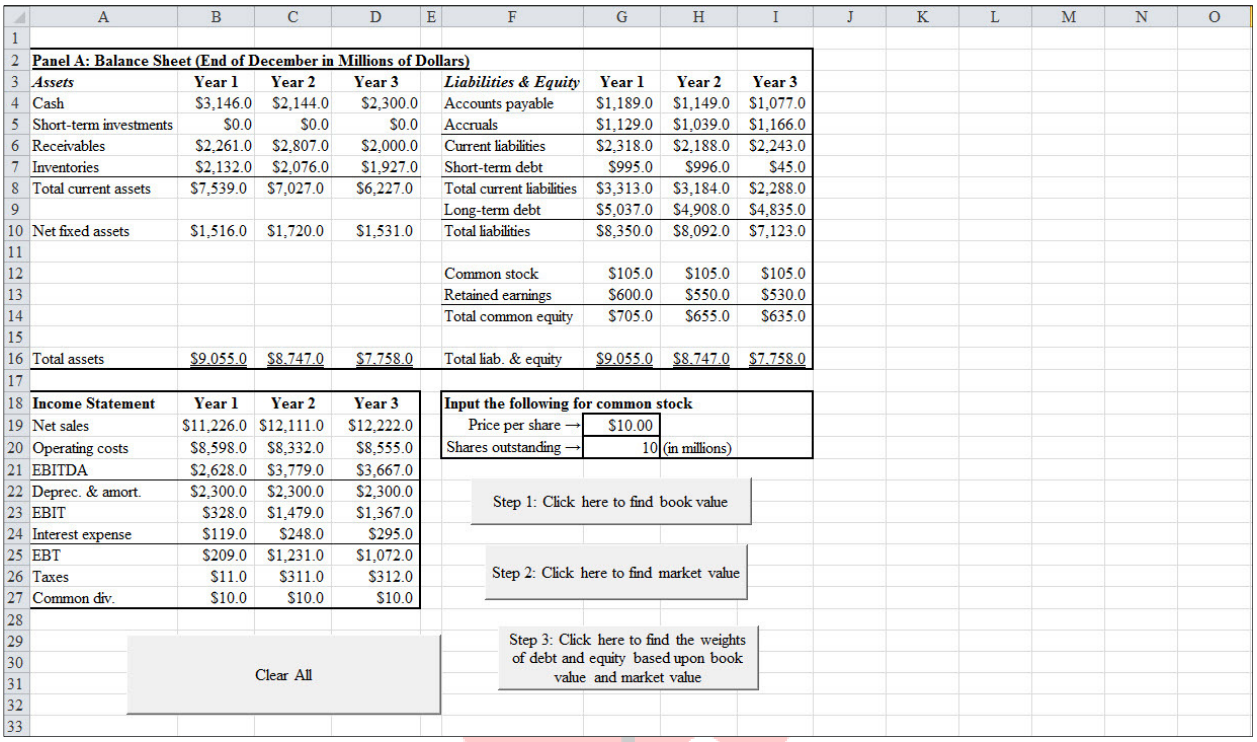
Saunders, K. (2001). Teaching methods and assessment techniques for the undergraduate introductory finance course: A national survey. *Journal of Applied Finance*, *11(1)*,110-112.

Truong, G., Partington, G., & Peat, M. (2008). Cost-of-capital estimation and capital-budgeting practice in Australia. *Australian Journal of Management*, *33(1)*, 95-122.

Windham, C. (2005). The student's perspective. In D. Oblinger and J. Oblinger (Eds.), *Educating the Net Generation* (pp. 5.1-5.16). Washington D.C.: Educause.

APPENDIX

Exhibit 1A



Panel A: Balance Sheet (End of December in Millions of Dollars)

Assets	Year 1	Year 2	Year 3	*Liabilities & Equity*	Year 1	Year 2	Year 3
Cash	$3,146.0	$2,144.0	$2,300.0	Accounts payable	$1,189.0	$1,149.0	$1,077.0
Short-term investments	$0.0	$0.0	$0.0	Accruals	$1,129.0	$1,039.0	$1,166.0
Receivables	$2,261.0	$2,807.0	$2,000.0	Current liabilities	$2,318.0	$2,188.0	$2,243.0
Inventories	$2,132.0	$2,076.0	$1,927.0	Short-term debt	$995.0	$996.0	$45.0
Total current assets	$7,539.0	$7,027.0	$6,227.0	Total current liabilities	$3,313.0	$3,184.0	$2,288.0
				Long-term debt	$5,037.0	$4,908.0	$4,835.0
Net fixed assets	$1,516.0	$1,720.0	$1,531.0	Total liabilities	$8,350.0	$8,092.0	$7,123.0
				Common stock	$105.0	$105.0	$105.0
				Retained earnings	$600.0	$550.0	$530.0
				Total common equity	$705.0	$655.0	$635.0
Total assets	$9,055.0	$8,747.0	$7,758.0	Total liab. & equity	$9,055.0	$8,747.0	$7,758.0

Income Statement	Year 1	Year 2	Year 3
Net sales	$11,226.0	$12,111.0	$12,222.0
Operating costs	$8,598.0	$8,332.0	$8,555.0
EBITDA	$2,628.0	$3,779.0	$3,667.0
Deprec. & amort.	$2,300.0	$2,300.0	$2,300.0
EBIT	$328.0	$1,479.0	$1,367.0
Interest expense	$119.0	$248.0	$295.0
EBT	$209.0	$1,231.0	$1,072.0
Taxes	$11.0	$311.0	$312.0
Common div.	$10.0	$10.0	$10.0

Input the following for common stock

Price per share →	$10.00	
Shares outstanding →	10	(in millions)

Step 1: Click here to find book value

Step 2: Click here to find market value

Step 3: Click here to find the weights of debt and equity based upon book value and market value

Clear All

Exhibit 1B

Panel A: Balance Sheet (End of December in Millions of Dollars)

Assets	Year 1	Year 2	Year 3	*Liabilities & Equity*	Year 1	Year 2	Year 3
Cash	$3,146.0	$2,144.0	$2,300.0	Accounts payable	$1,189.0	$1,149.0	$1,077.0
Short-term investments	$0.0	$0.0	$0.0	Accruals	$1,129.0	$1,039.0	$1,166.0
Receivables	$2,261.0	$2,807.0	$2,000.0	Current liabilities	$2,318.0	$2,188.0	$2,243.0
Inventories	$2,132.0	$2,076.0	$1,927.0	Short-term debt	$995.0	$996.0	$45.0
Total current assets	$7,539.0	$7,027.0	$6,227.0	Total current liabilities	$3,313.0	$3,184.0	$2,288.0
				Long-term debt	$5,037.0	$4,908.0	$4,835.0
Net fixed assets	$1,516.0	$1,720.0	$1,531.0	Total liabilities	$8,350.0	$8,092.0	$7,123.0
				Common stock	$105.0	$105.0	$105.0
				Retained earnings	$600.0	$550.0	$530.0
				Total common equity	$705.0	$655.0	$635.0
Total assets	$9,055.0	$8,747.0	$7,758.0	Total liab. & equity	$9,055.0	$8,747.0	$7,758.0

Panel B: Spreadsheet Results Activated by Embedded Macros

Book Value	% of Total	Market Value	% of Total
$995.0		$995.0	
$5,037.0		$5,037.0	
$6,032.0	49.1%	$6,032.0	42.9%
$105.0			
$600.0			
$705.0	50.9%	$100.0	57.1%
$6,737.0		$6,132.0	

Income Statement	Year 1	Year 2	Year 3
Net sales	$11,226.0	$12,111.0	$12,222.0
Operating costs	$8,598.0	$8,332.0	$8,555.0
EBITDA	$2,628.0	$3,779.0	$3,667.0
Deprec. & amort.	$2,300.0	$2,300.0	$2,300.0
EBIT	$328.0	$1,479.0	$1,367.0
Interest expense	$119.0	$248.0	$295.0
EBT	$209.0	$1,231.0	$1,072.0
Taxes	$11.0	$311.0	$312.0
Common div.	$10.0	$10.0	$10.0

Input the following for common stock

Price per share → $10.00

Shares outstanding → 10 (in millions)

Step 1: Click here to find book value

Step 2: Click here to find market value

Step 3: Click here to find the weights of debt and equity based upon book value and market value

Clear All

	Book Value	Market Value
Weight of debt, wd	49.1%	42.9%
Weight of equity, we	50.9%	57.1%

Exhibit 2A

Panel A: Calculating Weighted Average Cost of Capital (WACC)

	Year 1	Year 2	Year 3
Short-term debt	$995.0	$996.0	$45.0
Long-term debt	$754.0	$580.0	$520.0
Interest expense	$119.0	$248.0	$295.0
Income before taxes	$209.0	$1,231.0	$1,072.0
Income tax expense	$11.0	$311.0	$312.0
Dividend (most recent)	$1.0		
Current stock price, P	$10.00		
Average shares outstanding	$50.00		
Growth rate, g	15.0%		
Risk-free rate, r_{RF}	0.25%		
Market risk, β	1.00		
Market return, r_M	7.00%		

	Book Value	Market Value
Weight of debt, wd	**49.1%**	**42.9%**
Weight of equity, we	**50.9%**	**57.1%**

Step 1: Click here to calculate the before-tax and after-tax cost of debt

Step 2: Click here to calculate the cost of equity (CAPM)

Step 3: Click here to calculate the cost of equity (dividend growth)

Click here to carry over the weights of debt and equity before proceeding

Step 4: Click here to calculate WACC using book and market weights

Click here to clear the WACC calculations

Exhibit 2B

Panel A: Calculating Weighted Average Cost of Capital (WACC)

	Year 1	Year 2	Year 3
Short-term debt	$995.0	$996.0	$45.0
Long-term debt	$754.0	$580.0	$520.0
Interest expense	$119.0	$248.0	$295.0
Income before taxes	$209.0	$1,231.0	$1,072.0
Income tax expense	$11.0	$311.0	$312.0
Dividend (most recent)	$1.0		
Current stock price, P	$10.00		
Average shares outstanding	$50.00		
Growth rate, g	15.0%		
Risk-free rate, r_{RF}	0.25%		
Market risk, β	1.00		
Market return, r_M	7.00%		

	Book Value	Market Value
Weight of debt, wd	**49.1%**	**42.9%**
Weight of equity, we	**50.9%**	**57.1%**

Click here to carry over the weights of debt and equity before proceeding

Click here to clear the WACC calculations

Panel B: Spreadsheet Results Activated by Embedded Macros

Step 1: Click here to calculate the before-tax and after-tax cost of debt

Interest expense	$119.0
Average debt	$1,070.5
r_D	11.1%
Sum of income tax expense	$634.0
Sum of income before tax	$2,512.0
Tc	25.2%
$r_D(1-T_c)$	**8.3%**

Step 2: Click here to calculate the cost of equity (CAPM)

$r_{RF} + \beta(r_M - r_{RF})$	**7.0%**

Step 3: Click here to calculate the cost of equity (dividend growth)

$(D_1/P) + g$	**25.00%**

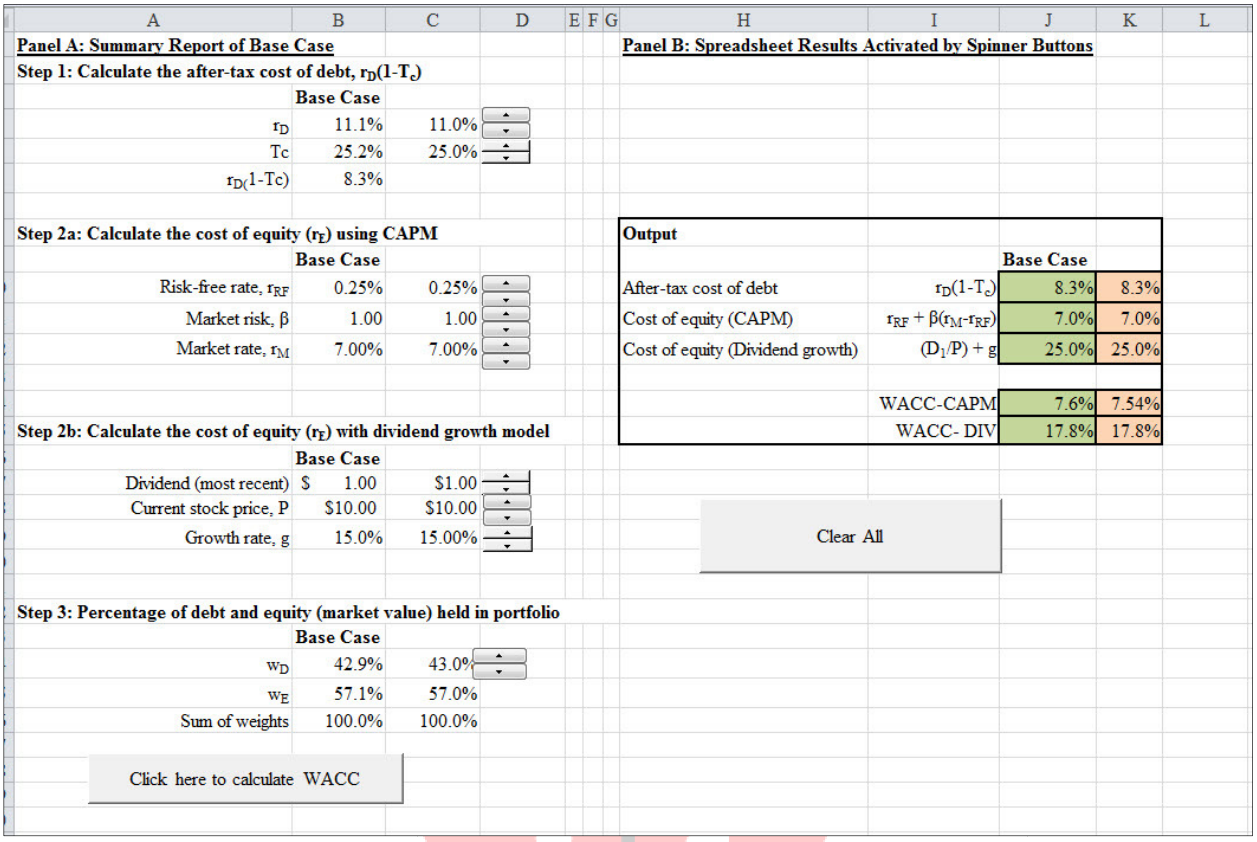
Step 4: Click here to calculate WACC using book and market weights

	Book Value	Market Value
WACC-CAPM	7.64%	7.56%
WACC-DIV	16.81%	17.84%

Exhibit 3A

	A	B	C	D	E	F	G	H	I	J	K	L
1	**Panel A: Summary Report of Base Case**											
2	**Step 1: Calculate the after-tax cost of debt, $r_D(1-T_c)$**											
3		**Base Case**										
4	r_D	11.1%	11.0%									
5	Tc	25.2%	25.0%									
6	$r_{D(}$1-Tc)	8.3%										
7												
8	**Step 2a: Calculate the cost of equity (r_E) using CAPM**											
9		**Base Case**										
10	Risk-free rate, r_{RF}	0.25%	0.25%									
11	Market risk, β	1.00	1.00									
12	Market rate, r_M	7.00%	7.00%									
13												
14												
15	**Step 2b: Calculate the cost of equity (r_E) with dividend growth model**											
16		**Base Case**										
17	Dividend (most recent)	$ 1.00	$1.00									
18	Current stock price, P	$10.00	$10.00									
19	Growth rate, g	15.0%	15.0%									
20												
21												
22	**Step 3: Percentage of debt and equity (market value) held in portfolio**											
23		**Base Case**										
24	w_D	42.9%	43.0%									
25	w_E	57.1%	57.0%									
26	Sum of weights	100.0%	100.0%									
27												
28	Click here to calculate WACC											
29												
30												
31												

Exhibit 3B



Panel A: Summary Report of Base Case

Step 1: Calculate the after-tax cost of debt, $r_D(1-T_c)$

	Base Case	
r_D	11.1%	11.0%
Tc	25.2%	25.0%
$r_D(1-Tc)$	8.3%	

Step 2a: Calculate the cost of equity (r_E) using CAPM

	Base Case	
Risk-free rate, r_{RF}	0.25%	0.25%
Market risk, β	1.00	1.00
Market rate, r_M	7.00%	7.00%

Step 2b: Calculate the cost of equity (r_E) with dividend growth model

	Base Case	
Dividend (most recent)	$ 1.00	$1.00
Current stock price, P	$10.00	$10.00
Growth rate, g	15.0%	15.00%

Step 3: Percentage of debt and equity (market value) held in portfolio

	Base Case	
w_D	42.9%	43.0%
w_E	57.1%	57.0%
Sum of weights	100.0%	100.0%

Click here to calculate WACC

Panel B: Spreadsheet Results Activated by Spinner Buttons

Output

		Base Case	
After-tax cost of debt	$r_D(1-T_c)$	8.3%	8.3%
Cost of equity (CAPM)	$r_{RF} + \beta(r_M - r_{RF})$	7.0%	7.0%
Cost of equity (Dividend growth)	$(D_1/P) + g$	25.0%	25.0%
	WACC-CAPM	7.6%	7.54%
	WACC- DIV	17.8%	17.8%

Clear All

Exhibit 4

Panel A: Summary Report of Base Case

Step 1: Calculate the after-tax cost of debt, $r_D(1-T_c)$

	Base Case	
r_D	11.1%	26.0%
Tc	25.2%	25.0%
$r_D(1-Tc)$	8.3%	

Step 2a: Calculate the cost of equity (r_E) using CAPM

	Base Case	
Risk-free rate, r_{RF}	0.25%	0.25%
Market risk, β	1.00	3.00
Market rate, r_M	7.00%	7.00%

Step 2b: Calculate the cost of equity (r_E) with dividend growth model

	Base Case	
Dividend (most recent)	$ 1.00	$1.00
Current stock price, P	$10.00	$17.00
Growth rate, g	15.0%	15.00%

Step 3: Percentage of debt and equity (market value) held in portfolio

	Base Case	
w_D	42.9%	63.0%
w_E	57.1%	37.0%
Sum of weights	100.0%	100.0%

Click here to calculate WACC

Panel B: Spreadsheet Results Activated by Spinner Buttons

Output

		Base Case	
After-tax cost of debt	$r_D(1-T_c)$	8.3%	19.5%
Cost of equity (CAPM)	$r_{RF} + \beta(r_M - r_{RF})$	7.0%	20.5%
Cost of equity (Dividend growth)	$(D_1/P) + g$	25.0%	20.88%
	WACC-CAPM	7.6%	19.87%
	WACC- DIV	17.8%	20.01%

Clear All