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# THE CHOICE OF VALUATION TECHNIQUES IN PRACTICE: EDUCATION VERSUS PROFESSION

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## Abstract

We use a survey approach to learn about valuation professionals' choices and implementations of valuation techniques in practice. The survey design allows us to control for a respondent's professional subgroup (e.g., consulting), education, experience, and valuation purpose characteristics. We find support for the "sociological hypothesis" that profession matters more than education; different professions have different valuation cultures. Other factors are less important. There are also many commonalities across respondents. Most use both multiples and DCF, but implement DCF in a way that almost turns it into a multiples exercise. Confusion reigns with respect to interest tax shields and the WACC. Higher educational levels do not reduce the confusion. Our overall findings matter because valuation professionals function as intermediaries in the capital allocation process. The relative unimportance of education raises questions about the role and benefit of higher level finance education.



JEL Classification: G31, G32, G24, G02, A11, A14, A20

Keywords: Valuation, valuation cultures, sociological hypothesis, multiples, DCF, finance education



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# The Choice of Valuation Techniques in Practice: Education versus Profession [1]

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**Abstract**

# The Choice of Valuation Techniques in Practice: Education versus Profession

We use a survey approach to learn about valuation professionals' choices and implementations of valuation techniques in practice. The survey design allows us to control for a respondent's professional subgroup (e.g., consulting), education, experience, and valuation purpose characteristics. We find support for the "sociological hypothesis" that profession matters more than education; different professions have different valuation cultures. Other factors are less important. There are also many commonalities across respondents. Most use both multiples and DCF, but implement DCF in a way that almost turns it into a multiples exercise. Confusion reigns with respect to interest tax shields and the WACC. Higher educational levels do not reduce the confusion. Our overall findings matter because valuation professionals function as intermediaries in the capital allocation process. The relative unimportance of education raises questions about the role and benefit of higher level finance education.

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# 1 Introduction

> "There seem to be lots of academics asking how analysts in the real world use CAPM or calculate the cost of capital. The answer is, people don't waste time on this. No one ever lost/made money because they calculated the WACC better than consensus. You accademic [sic] guys are wasting your time."
> -A consultant[1]

Academics and practitioners do not always agree when it comes to the implementation or relevance of theoretical concepts. Corporate finance, being a practical discipline, profits from the wisdom of both sides, but also appears to harbor disputes between the two. Correct valuation is a major issue for those who are in business. For researchers, it is a challenging field of work. The most established methods to value a project or a company are relative valuation, what people refer to as "multiples," and multiperiod models. Finance textbooks tend to emphasize the latter and especially the technique of discounted cash flows (DCF).[2] These approaches differ on several levels: by the inputs one needs to consider, by the caveats one has to be aware of, and, most crucially, by the results one gets. Anecdotally, some practitioners are of the opinion that DCF is too academic and theoretical. In contrast, multiples are viewed as delivering market-oriented results in addition to being easier to implement. As expressed by the consultant in the quote above, the cost of capital, a major input into a DCF valuation, is sometimes viewed as an academic concept that has little practical relevance. However, it is unclear how widely held this belief is or, in general, how practitioners approach valuation. In this paper, we shed light on this issue by using a survey approach to learn about valuation professionals' choices of valuation techniques in practice. This matters because valuation professionals function as intermediaries in the capital allocation process. It is also interesting in its own right.

The paper works on two levels. First, it maps out how valuation professionals go about the business of valuation; what are the methods they use and how do they implement them? This basic analysis is then used to ask a deeper question; namely, what factors affect a

[1] Comment by a survey respondent working in the consulting industry.

[2] See, e.g., Ross, Westerfield, and Jaffe (2012), Berk and DeMarzo (2013), and Brealey, Myers, and Allen (2013).

valuation professional's choice of method and implementation approach? In particular, the survey design allows us to examine the importance of a valuation professional's educational background versus his, or her, professional subgroup (e.g., consulting).

The vast majority of our survey respondents typically employ both relative valuation and multiperiod models, with those having a preference for one or the other being close to evenly divided in the population. By far the most popular multiple is EV/EBITDA, with 84% in our sample saying they use this multiple always or almost always when they use multiples.[3] Respondents favor using 12-month forward estimates of earnings and, on average, employ eight comparables picked primarily from rivals in the same industry, also paying attention to size and expected growth.

The most popular multiperiod model is DCF. Respondents typically discount expected cash flows at the weighted average cost of capital (WACC), with the cost of debt being estimated by the riskfree rate plus a spread and the cost of equity being estimated by the CAPM. Multifactor models are rarely used. The riskfree rate is most commonly taken to be the yield on a long-term Treasury security. Cash flows are typically projected for only five years. Terminal values are calculated using the Gordon growth model, with the most popular choices of growth rates being 2% and the expected GDP growth.

With these choices and with realistic assumptions on the discount rate and forecasting horizon growth rates, we show by way of examples that the fraction of the total gross value of a project that can be attributed to the terminal value is around 70%. This underscores the practical significance of the forecasting horizon and the terminal value. It also implies that the way the technique of DCF is implemented in practice means that it collapses to being almost just another multiples exercise, with the majority of the estimated value being attributable to the forecasted cash flow in the first year after the forecasting horizon multiplied by one over the discount rate less the growth rate.

While respondents discount cash flows at the WACC, it is clear from their answers to other questions that confusion reigns with respect to the well known result, articulated in most textbooks, that the WACC is sensitive to leverage because of interest tax shields. On the whole, respondents do not exhibit a deep understanding of how to deal with tax shields when they carry out a DCF analysis. Incorrectly implemented valuation methodologies by

[3]EV is enterprise value. EBITDA is earnings before interest, depreciation, and amortization.

valuation professionals are important to the extent that the valuations they come up with affect the allocation of resources in the economy. The valuation professionals' confusion therefore points to a challenge for finance academics to improve the effectiveness of their teaching.

This leads us to the second, deeper contribution of this paper. In particular, by utilizing respondent background information, we study the question as to what factors affect a respondent's dominant choice of valuation method. This analysis is framed as a contest between educational background versus a respondent's professional subgroup (consulting, investment banking, private equity, or asset management). But we also investigate and control for other respondent characteristics, especially paying attention to the type of investment (project finance, listed firms, unlisted firms, real estate) that the respondent is typically involved in, the type of transaction (mergers and acquisitions, investment decisions, going public or private), and whether the respondent tends to be on the buy or sell side or in an advisory role. For succinctness, we refer to these three sets of characteristics collectively as describing "the purpose of the valuation" for a respondent.

Intuitively, one may expect those with a more advanced degree to use more sophisticated methods and to implement them with fewer conceptual mistakes. But it is also plausible that different cultural norms within professional subgroups affect preferred valuation approaches. Sociology and social psychology have long recognized that professions have identifiable cultures and that individuals are prone to influence from peers and groups (see, e.g., Asch 1955, Greenwood 1957). In the finance literature, Bob Shiller was an early proponent of some of these ideas (see, e.g., Shiller 1984). A recent contribution in this space by Hvide and Östberg (2015) documents that individuals are prone to adopting the investment biases prevalent in their place of work. Our comparison of the influence of education versus professional subgroup is fundamentally motivated by the pioneering work of Harris (1995, 1998), who demonstrates that children's values and behavior are influenced more by their peers than by their upbringing at home. Translated to our setting, the hypothesis is that valuation professionals' approach to valuation is influenced more by their peers at work than their educational background; valuation professionals adopt the "valuation culture" of the professional subgroup they are enlisted into. The existence of such valuation cultures can be tested for by examining differences in valuation approaches across professional subgroups. In contrast to a potential education level effect, there is no

a priori reason as to why one profession should use more sophisticated valuation methods than another.

We find that there are distinct differences across professions with respect to some elements of the choice of valuation technique. Furthermore, these differences are not ones that could be said to be related to "sophistication." In contrast, education levels hardly matter. We show through cluster analysis that our result on the importance of profession is robust to controlling for the purpose of the valuation. Cluster analysis allows us to handle the high degree of correlation between the different variables that collectively describe the purpose of the valuation, as summarized above. Different professional subgroups have different emphasis with respect to the purpose of the valuation. However, within professions, one can identify clusters of individuals with different foci. We find that valuation methods are largely cognate across these within-profession clusters, leading us to conclude that the purpose of the valuation is not the main feature determining how a valuation professional goes about the task of valuation. Between-profession regressions using the same within-profession clusters support this view. There is also nothing by way of theory that says that different purposes should involve different valuation methods. The evidence thus supports the "sociological hypothesis" that different subgroups of valuation professionals have valuation cultures that emphasize slightly different approaches. This matters because it implies that the valuations that valuation professionals come up with have a degree of arbitrariness about them in the sense that they are heavily influenced by "where" the valuation is carried out.

Our findings also have implications for finance education; namely, that higher-level finance education may have the most impact if carried out in the work-place. This may well also hold true for other business and management subjects where disparate theories and approaches flourish.

The focus and depth of our survey distinguishes it from other surveys on valuation methods. The most prominent of these is that by Graham and Harvey (2001). This and other surveys we are aware of are directed at CFOs and focus on the capital budgeting process within firms.[4] They ask questions about the broad methods firms employ, but,

[4]See, e.g., Bancel and Mittoo (2004) and Brounen, de Jong, and Koedijk (2004) who carry out similar studies as Graham and Harvey (2001) in Europe and yield comparable results. Mohan, Ainina, Kaufman, and Winger (1991), Arnold and Hatzopoulos (2000), Ryan and Ryan (2002), and Mukherjee, Kiymaz, and

unlike our survey, do not go into depth with respect to implementation. They also do not explore the usage of multiples, but focus on multiperiod models. Our survey thus fills an important gap in this branch of the literature by focusing on valuation professionals as well as asking a broader set of questions. In the process, we contribute beyond providing basic survey descriptive statistics by presenting evidence that there are different valuation cultures within the distinct subgroups of the financial valuation profession. Thus, our survey differs both in terms of the richness of the questions we ask and in terms of the questions we can ask of the data.

The rest of this paper is organized as follows. Section 2 describes the survey and provides some basic statistics on response rates. Sections 3, 4, and 5 tabulate the survey's findings and compare the impact of educational level with that of respondents' profession subgroup, focusing on multiples and multiperiod models, respectively. Section 6 studies the purpose of the valuation and its relative importance using cluster analysis. Section 7 concludes.

# 2 The survey

## 2.1 Questionnaire

The are four parts to the questionnaire. The first part asks a series of background and personal questions that relate to the purpose of valuation, educational level achieved, experience, gender, regional focus, and so on. Full details are in the survey questionnaire itself, which can be found on one of the authors' webpage. The second and third parts focus on relative valuation and multiperiod models, respectively. Examples of the latter include discounted cash flows (DCF), economic value added (EVA), and the dividend discount model (DDM). The fourth part concludes with some general questions that further elucidate a respondent's preferred valuation approach. The survey contains thirty-three numbered sets of questions, with six of these having labelled subsets of further questions. Most questions are multiple choice, where answers can be given on a scale from "Never" (0) to "Always" (4). Four questions are open-ended, fifteen questions are single-choice ("yes/no"), and four are multiple-choice questions where more than one answer is possible.

Baker (2004) also focus on CFOs and firms.

Participants can provide additional details to individual questions if the set of listed choices is incomplete. There is also a possibility to leave further comments in a space at the end of the survey. The main analysis in this paper revolves around 98 questions from parts two, three, and four of the survey.

## 2.2 Delivery, response rates, and final sample

The survey was conducted online with the help of the LimeSurvey tool.[5] Email invitations with the link to the survey were sent to 4,500 investment professionals between May 15 and June 6, 2012. These were divided up into 1,132 consultants, 1,176 investment bankers, 1,377 private equity professionals, and 815 asset managers, predominantly based in Western Europe. Recipients had access to the survey for three weeks following the day the email invitations were sent. In total, 378 responses were recorded. Thirty of these had duplicate names. We kept only one record per respondent, giving preference to the latest and most complete record. In addition, forty-nine blank records were deleted, giving us a sample of 299, which represents a response rate of 6.6%. This is comparable with other surveys in this area.

The 299 response records were examined for completeness. Because of our interest in learning about what multiples valuation professionals use, we kept all records with at least two questions answered (out of five) in the relative valuation part of the questionnaire. Only one name who had less than two questions answered in the relative valuation part had responded to the third and the fourth parts of the questionnaire. This respondent had answered 66% of the entire survey and was kept in the final sample. We dropped one record that had blanks everywhere except for the section on relative valuation, where the person responded "0" on everything. This left us with a final sample of 272 records (individual names). All individuals in the final sample answered at least 30% of all questions.

**Insert Table 1 here.**

Table 1 presents an overview of response rates, survey completeness, and the final sample, by profession. Consultants have the highest response rate (10.0%) and make up the largest professional subgroup among respondents (41.5%). This is followed by investment

[5]LimeSurvey is a free software for conducting online surveys. See www.limesurvey.org.

bankers (6.1% and 26.5%), private equity (4.2% and 21.3%), and asset managers (3.6% and 10.7%).

### 2.3 Some respondent characteristics

Figure 1 summarizes some basic characteristics of the respondents in the final sample of 272. As seen, most respondents are seasoned professionals. More than 97% are older than thirty years of age and more than 60% have more than ten years of professional experience. Respondents are predominantly male, with only 10% being female. With respect to geographical region, 212, or 77.9%, have a focus on Western Europe. Twenty-three respondents have no geographic focus, while a few have multiple regions of focus. While not shown in the figure, education levels range from Bachelor to PhD, with 123 having an MBA and 36 being chartered financial analysts (CFAs). Educational background is an important variable in the subsequent analysis and is discussed in more detail below.

**Insert Figure 1 here.**

## 3 Analysis: Preliminaries

This section provides preliminary information on the general choice between multiples versus the more textbook oriented discounted cash flows (DCF) multiperiod approach. We tabulate responses by profession, educational background, and experience and test for the extent to which these respondent characteristics influence respondents' preferred valuation approaches. The basic structure of the analysis in this section is adopted in Sections 4 and Sections 5, which study the details of respondents' specific approaches to valuation using multiples and multiperiod models, respectively. In particular, the basic layout of Table 2 in this section, which contains the results on the overall choice of valuation approach, is repeated in the tables in the next two sections. We therefore start by describing the general structure of these tables, before turning to the specifics of the results.

## 3.1 General structure and basic results

We describe the general structure of the survey response tables and our analysis in Sections 3 to 5 by focusing on Table 2. The table consists of several panels bound together by a common theme, namely the overall, broad approach to valuation and, in particular, the choice between using multiples versus DCF. Each panel summarizes the answers to specific survey questions with answers on the 0 ("never") to 4 ("always") scale. An example is Panel A, Table 2, which we can think of as our generic "response panel." Where answer choices are not on the 0–4 scale, response panels are slightly different. These are discussed in the more specific context of the analysis of the results. The last panel in Table 2 is a "regression panel" that will be described below as well.

**Insert Table 2 here.**

The generic response panel (Table 2, Panel A) is comprised of four subpanels, or blocks, with each row going across the subpanels corresponding to a specific survey question. Going from left to right, the first subpanel provides overall statistics for each question on: (i) the number of respondents; (ii) the percent of replies that are 1 to 4, indicating that the respondent uses the method (for example) in question at least sometimes; (iii) the percent of replies that are 3 or 4, indicating a response of almost always or always; and (iv) the average response across respondents on the 0–4 scale. For example, 194 respondents answered the question as to whether they use both multiples and multiperiod models, with the average strength of the response (on the 0–4 scale) being 2.97 and 76% reporting that they use both methods almost always (3) or always (4). Thus, as a rule, valuation professionals tend to use both methods.

The second subpanel, labelled "Profession," provides the mean (on the 0–4 scale) response per question for each professional subgroup; Consulting (Cons.), Investment Banking (IB), Private Equity (PE), and Asset Management (AM).

The third subpanel, labelled "Education," does the same for five different educational groups; Bachelor (BA), Master (MA), Doctoral degree (PhD), Master of Business Administration (MBA), and Chartered Financial Analyst (CFA). Respondents are classified into one of these educational groups according to the following hierarchical rule: Respondents with a CFA diploma (who may have other education as well) are labelled "CFA;" else, respondents with an MBA (who also may have a BA, MA or PhD) are labelled "MBA;" else,

respondents are labelled according to their highest degree in the following order, PhD, MA, BA. We are especially interested in MBAs as this is a flagship degree in business schools. Students coming out of such programs would be expected to have a solid understanding of basic valuation techniques, such as what we examine in this survey. For this reason, we classify respondents with doctoral degrees as MBAs if they have that qualification. CFAs are singled out first according to our classification algorithm as this is a specialized financial analyst qualification. As seen in Table 2, in the full sample of 272 respondents, the distribution across educational levels is as follows:

| BA | MA | PhD | MBA | CFA |
|---|---|---|---|---|
| 52 | 37 | 17 | 123 | 36 |

The fourth subpanel, labelled "Experience," provides mean (on the 0–4 scale) responses for two experience subgroups; those with less, alternatively more, than ten years of experience. In the full sample of 272 respondents, 168 report that they have more than ten years of experience.

For each group in each subpanel, the choice with the highest mean (or percentage) is indicated in bold. For example, in Table 2, Panel A the strength of the response for experienced valuation professionals is strongest for "Both multiples and DCF," being 3.09.

Within each of the last three (rightmost) subpanels, we test for significant effects from profession, education, or experience by carrying out means tests of each individual group against the complement population (all other groups). Statistical significance is reported on the 1% (a), 5% (b), and 10% (c) levels. These tests allow us to gauge the importance of profession, education, or experience with respect to respondents' choice of valuation approach. A higher count of statistically different means within the profession subpanels as compared with the education subpanels, for example, would be support for the sociological hypothesis that there are valuation cultures within different professional subgroups that override educational influences. This is examined in the next subsection.

The means tests are supplemented by regression analysis that is reported on in the bottom panel. In particular, for each individual survey question (except "other"), $j$, in the response panels, we run the following two regression specifications:

$$y_{ij} = \beta_{0j} + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} MBA_i + \beta_{5j} HExp_i + \beta_{6j} LS_i + \varepsilon_{ij}, \quad (1)$$

and

$$\begin{aligned} y_{ij} = \quad & \beta_{0j} + \beta_{1j} Cons_{ij} + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} BA_i + \beta_{5j} MA_i \\ & + \beta_{6j} PhD_i + \beta_{7j} CFA_i + \beta_{8j} HExp_i + \beta_{9j} LS_i + \varepsilon_{ij}, \end{aligned} \tag{2}$$

where $y_{ij}$ is respondent $i$'s answer to question $j$. The RHS variables of the regression equation are indicator variables for different professional groups and educational levels, as described above. In addition, *HExp* is an indicator variable for having more than ten years of experience and *LS* (Large Size) is an indicator variable for respondent $i$ having focus on firms with more than EUR 5 billion of assets. Whereas the first specification focuses on MBAs versus all other education levels, the second specification takes MBAs as the baseline education level and introduces dummy variables for the other levels. For each specification, the regression panel reports the number of statistically significant coefficients (at the 10% level or better) per variable across all regressions. A dash indicates that a variable is not part of the regression.

These regressions are thus designed to examine the extent to which respondents' educational levels or professions affect their approach to valuation. The regressions control for experience and size focus, but we note up front that the results without these two controls are not different in a noteworthy way. With these preliminaries in place, we now turn to discussing the specific findings in Table 2.

## 3.2 Multiples versus DCF by profession and education

As noted above, Table 2 shows that most respondents use both multiples and DCF. Consultants ($3.29^a$) are more likely to use both approaches, while private equity professionals ($2.03^a$) are less likely. The numbers in brackets are the mean response strengths, with the superscript indicating the level of statistical significance (as described above), if any. Respondents whose highest degree is an MA ($3.46^a$) or are more experienced ($3.09^c$) are relatively more likely to use both approaches, while MBAs ($2.71^a$) are less likely.

We have also asked whether respondents who use both multiples and DCF favor one or the other method. Forty-seven percent of respondents declare that they use both, but primarily multiples, almost always or always. Forty-six percent use both, but primarily DCF. On the four point scale, the averages to these two choices are 2.18 and 2.12, respectively. The scores for "multiples only" and "DCF only" are much lower; 1.59 and 1.28,

respectively.

Reading down through the table, we see that most respondents use sensitivity (68%) or scenario (57%) analysis at least almost always, but only 39% use a sum of parts valuation almost always or always. We also see in Panel D that the main reason for not using multiperiod models such as DCF is the uncertainty behind cash flows. This holds for all professions and education levels, except for PhDs, whose most popular answer is that it is too time-consuming(!).

Comparing the impact of profession versus education, the table shows that there is more variation in terms of statistically significant means within the profession block as compared with the education block. The number being 15 versus 10 over all panels. That profession is more important with respect to differences in valuation approach is supported by the regression results in Panel E. In Specification 2, which is the specification that has dummy variables for all education levels, there are 11 statistically significant coefficients on the profession side, as compared with 4 on the education side. While there are differences across professions, a glance at the numbers in Table 2 also shows that there are substantial similarities. So a reasonable hypothesis may be that basic bachelor level finance education forms a baseline on which different professions innovate in their own different ways. We will see whether this continues to be the case when looking more deeply into how the respondents report that they carry out valuations using multiples and multiperiod models.

# 4 Multiples

There is an often heard claim among practitioners that multiples are better, more market-oriented, and a less tedious method of valuation than DCF. One often hears that people use multiples first and then back up the results with DCF. This is supported by the survey finding that about half of the respondents use both methods, but favor multiples (Table 2). In this section, we study the usage of multiples in more detail by reporting on which multiples survey respondents favor and how they use them.

The first set of findings are in Table 3, which presents responses by profession, educational background, and experience in the same manner as Table 2 did for the general choice of valuation approach.

**Insert Table 3 here.**

As seen in Panel A, the most popular multiple is EV/EBITDA (enterprise value to EBITDA). Eighty-four percent of respondents answer that they use this multiple always or almost always (conditional on using multiples). The average response strength for this choice is 3.34 overall in the sample. For Consultants and PE professionals it is $3.62^a$ and 3.41, respectively. Its usage is lowest among asset managers ($2.75^b$) whose most popular choice of multiple is P/E (price/earnings, $2.93^a$). Investment bankers are also heavy users of P/E (3.11). This may reflect that investment bankers and asset managers are more focused on listed firms. The role of the purpose of the valuation is studied in more detail in Section 6. In the sample overall, P/E (2.26) and industry specific multiples (2.27) are the most popular choices after EV/EBITDA, EV/EBITA, and EV/EBIT. Industry specific multiples are more popular among consultants ($2.45^c$) than among other valuation professionals. EV/EBITDA is also the most popular choice across all education levels and both experience levels, with P/E being the second highest choice for those with education levels of BA, MA, and CFA. MBAs and PhDs second highest choices are EV/EBIT and EV/S (sales). More means are statistically significantly different from their respective (complement) norms in the profession block (28) than the education block (6).

An important element of the implementation of the multiples approach to valuation is whether to use trailing or forward looking earnings (or other relevant denominators) when calculating the multiple. Respondents use both forward looking and trailing multiples, but favor the former. Panel B shows that 80% of respondents always or almost always use 12-month forward multiples, with 55% always or almost always using trailing multiples.[6] Twenty-four month forward multiples are rarely used. The average strength of response for the 12-month forward multiple is 3.13. There is some variation among the different professions, but little across the different education levels. Private equity professionals favor trailing multiples ($3.05^a$), while mean responses for each education level show a uniform preference for 12-month forward multiples.

In response to the question as to what firm or project characteristics affect the choice of multiple (Panel C), 89% of respondents answered that "industry sector" almost always

[6]In the academic literature, forward multiples are typically found to perform better than trailing multiples (Alford 1992, Kim and Ritter 1999, Lie and Lie 2002, and Liu, Nissim, and Thomas 2002).

or always does so. All professions and education levels have this as their most popular choice, with the average strength of response being 3.44 and the individual profession and education means sitting in a tight band from 3.35 (asset managers) to 3.56 (PhDs), with no statistical significance in the means. Earnings and margin stability (70%) and capital intensity (59%) are the next two most impactful factors overall and for each individual profession, education, and experience level.

**Summary: Education vs Profession (Table 3)**
Across all three panels, there are 43 significant means in the profession block and 10 in the education block. This difference in impact is backed up by the regressions in Panel D. Under specification 2, there are 23 significant profession coefficients across all 20 regressions, as compared with only 7 significant education coefficients. For experience, there is none.

## 4.1 Example: The choice of multiple matters

One may ask how important the findings in Table 3 are. Even if some professionals prefer one set of multiples over the other, does it matter? Below we answer this question by way of an example of a simple multiples valuation exercise using a randomly chosen company on two randomly chosen dates. The idea of the exercise is to see how well multiples would perform in a setting where we happen to have the enterprise value of a company as assessed in the market.

The company is Green Mountain Coffee Roasters, which changed its name to Keurig Green Mountain on March 10, 2014.[7] The valuation dates are February 14, 2014 (Green Mountain) and February 24, 2015 (Keurig). All data is taken from Bloomberg on these two dates.

We use both 12-month forward and trailing EV/EBITDA, EV/EBIT, P/E, P/B (book), and P/CF (cash flows).[8] The comparables set is important in any valuation. So as not to inject any biases we personally may have into the exercise, for each date we took a com-

[7]Keurig was a subject to a takeover bid by JAB Holding on December 7, 2015. See, e.g., "JAB grows coffee empire with $13.9bn Keurig Green Mountain deal," by Massoudi, Fontanella-Khan, and Daneshkhu, *Financial Times*, December 7, 2015. This is well after our two sample dates.

[8]P/B uses book value and so the distinction of forward versus trailing multiple is not relevant for this particular multiple.

parables set generated automatically on the Bloomberg system on the respective date.[9] To investigate the effect of the comparables set, we subdivide the two sets of "Bloomberg comparables" into the 50% largest and smallest, by market capitalization. Thus, for each date, the exercise is carried out on three sets of comparables (small cap, large cap, all Bloomberg comparables).

For each comparables set, we calculate the average multiple and then apply it to the relevant earnings etc. of Green Mountain/Keurig. So estimating enterprise value using the EV/EBIT(DA) multiples is done in the obvious, trivial way. Using price ratios involves two steps. For example, to estimate the enterprise value with the P/E ratio, we first calculate an estimated price, $\widehat{Price}$, of Green Mountain/Keurig by multiplying its EPS by the average P/E for each set of comparables and then, calculate an estimated enterprise value of Green Mountain by using the definition in Bloomberg:

$$\begin{aligned} \widehat{EV} = \quad & \widehat{Price} \times N_{Sh} + Pref.Equity + Minority\ Int. + Tot.Debt \\ & - Cash\&Marktb.Securities - Other\ non\text{-}cash\ Adj., \end{aligned} \tag{3}$$

where $N_{Sh}$ is the number of shares of Green Mountain/Keurig.

Table 4 reports the resulting valuation errors in absolute value terms, i.e., $\mid EV_{true} - \widehat{EV} \mid$ in USD mill. The true enterprise value of Green Mountain on February 14, 2014 (Panel A) was USD 15,900 mill, and for Keurig on February 24, 2015 (Panel B) it was USD 18,672. In each panel, the highest and the lowest valuation errors are indicated in bold.

**Insert Table 4 here.**

We see that the valuation error is sensitive to the choice of multiple and on the set of comparables. In Panel A, the closest value arises from using trailing P/CF on the small market cap comparables set. The valuation error is a mere USD 563 million, or

[9] On February 14, 2014 (Green Mountain), the comparables were Nestlé, Coca-Cola, PepsiCo, Mondelēz International, Danone, Associated British Foods, and General Mills in the "Large" group and Kerry Group, ConAgra Foods, Monster Beverage, Lindt&Sprüngli, Dr Pepper Snapple Group, Smucker's, Tata Global Beverages, and Dean Foods in the "Small" group. On February 24, 2015, (Keurig), the comparables were Nestlé, Coca-Cola, PepsiCo, Mondelēz International, Danone, Associated British Foods, General Mills, and Monster Beverage in the "Large" group and Dr Pepper Snapple Group, ConAgra Foods, Lindt&Sprüngli, Kerry Group, Smucker's, Tata Global Beverages, and Dean Foods in the "Small" group.

3.5% of Green Mountain's enterprise value. However, using the large comparables set, the valuation error from the trailing P/CF multiple is a whopping 5,423, or 34.1%. The 12-month forward P/CF multiple performs even worse and is the worst performer of all on the large comparables set. For this set, the best performing multiple is 12-month forward EV/EBIT, with a valuation error of 2,434, or 15.3%.

While this is only one example, we have done other examples as well, with the best performing multiple varying from company to company and across comparables sets. This lesson is brought home by the results in Panel B. Here, the trailing P/CF multiple on the small comparables set has gone from the best to being the worst performing multiple, with a valuation error of USD 8,632 mill, or 46.2%. The smallest valuation error now is found by using trailing EV/EBIT and is a remarkably small USD 25 mill, or 0.1%. But this is a lucky strike rather than an example of consistent performance. The overall lesson is that there does not seem to be a general rule as to what the best performing multiple actually is. It is unclear as to why EV/EBITDA is so popular among valuation professionals.

The example in Table 4 illustrates that the best performing multiple depends on the choice of comparables. Thus, it is not only the multiple itself that matters, but how it is used. There is very little academic research on this topic, yet it is very important in practice. One does not learn much about multiples in University, but at the workplace. As one investment banker commented: "A lot depends on experience of what 'works'." This refers not only to the choice of multiple, but to the implementation of the valuation. From what we can see from this example, obtaining accurate valuations with multiples is neither simple nor necessarily market based – perhaps unless you master the art of choosing the right multiple for the right comparables set – unlike what is expressed in the anecdotal claim we started this section with.

## 4.2 Choosing comparables

As illustrated by the example, the comparables set is crucial with respect to the performance of a multiples valuation. Table 5 reports on how survey respondents go about the picking of comparables. In contrast to our example, valuation professionals do not tend to simply pick the Bloomberg comparables; while 60% use it some of the time, only 16% use this set almost always or always. Still, the two most popular choices include factors that

presumably enter into Bloomberg's algorithm. These are rivals (3.48) and firms in the same industry (3.45), which respondents use almost always or always 91 and 89 percent of the time, respectively.

**Insert Table 5 here.**

A second tier of characteristics are formed by size (2.49) and expected growth (2.34). Taking account of these two characteristics makes sense from a conventional discounting perspective. The mathematical effect of positive growth is equivalent to lowering the cost of capital (consider, e.g., the formula for a growing perpetuity), and thus raising value.[10] Furthermore, the literature on empirical asset pricing has found that expected equity returns (cost of equity) are inversely related to size and the market-to-book (or P/B) ratio, with the latter increasing in growth, ceteris paribus, as we just observed (Fama and French 1993). In addition, we also know that large firms have more liquid stocks and often better access to credit markets, both of which help reduce the cost of capital and thus raise value.

These broad findings on the choice of comparables hold for all professions, education, and experience levels. But investment bankers have a stronger strength of response on placing emphasis on rivals in the comparables set ($3.68^a$) than others, while, with respect to the second tier of characteristics, private equity professionals place more emphasis on expected growth ($2.60^c$). Finally, Panel B reports that around eight comparables are used on average, with the range of the means within the four professions going from $6.76^a$ for private equity to $9.13^a$ for consultants. No means are statistically different from their respective (complement) norm for any of the education groups.

Eight comparables may seem like a small number when compared with the academic literature where the performance of multiples-based valuation is typically assessed using very large comparables sets (e.g., all firms in the same "industry," see, e.g., Liu, Nissim, and Thomas 2002). However, Cooper and Cordeiro (2008) show that using simple, but smarter, one-factor selection rules, one can do just as well with around ten comparables.[11] As seen from our findings in Table 5, valuation professionals typically take several factors into

[10] As seen in (5) with the WACC as the discount rate.

[11] See also Alford (1992), Bhojraj and Lee (2002), and DeFranco, Hope, and Larocque (2015) for studies on the selection of comparables.

account in practice. We know that practitioners pay close attention to the comparables. A common saying is that the most important thing in valuation is the set of comparables. The eight or so comparables typically used in practice presumably reflects learned wisdom that with a good selection rule, this is enough.

**Summary: Education vs Profession (Table 5)**

There are 17 significant means in the profession subpanels and 3 in the education subpanels. In the regressions in Panel C (specification 2), the profession block has 10 statistically significant coefficients; whereas, the education block has only 1. In terms of significant regression coefficients in our two multiples tables (3 and 5), the score therefore adds up to: profession 33, education 8, experience 1. The conclusion thus far is therefore that education beyond the Bachelor level does not seem to matter much in terms of the preferred multiples valuation approach of valuation professionals. The only factor that modifies the baseline to any large extent is the profession an individual belongs to. Thus, our findings so far support the sociological hypothesis that there are cultural variations in the approach to valuation across professions.

# 5 Multiperiod models

This section starts by reporting on the usage of different multiperiod models before studying more closely how the particular technique of discounted cash flows (DCF) is implemented by survey respondents. With respect to DCF, the survey contains questions about forecasting horizons and terminal values, the calculation of the cost of capital, and the usage of the weighted average cost of capital (WACC). In addition, a number of questions are designed to investigate respondents' understanding of the effects of the tax shields that arise from the tax deductibility of interest payments. As before, we are also interested in examining the influence of respondents' professions and educational levels with respect to what methods they prefer and how they implement them.

## 5.1 Basics

The top panel in Table 6 reports on the popularity of DCF, residual income models (RIM), economic value added (EVA), dividend discounting models (DDM), and the internal rate

of return (IRR). As seen, DCF is by far the most popular method, with an overall average strength of response of 3.2. Seventy-six percent of respondents report that they use DCF almost always or always (conditional on using a multiperiod model). With one exception (private equity), DCF is also the most popular method among all professions and educational levels and both experience levels. Private equity professionals' preference is for using the internal rate of return ($3.10^a$). In the sample as a whole, the IRR is the second most popular choice, with an overall score of 2.25.

**Insert Table 6 here.**

Panels B and C ask more specific questions about DCF. The main finding in Panel B is that people overwhelmingly report that they calculate net present value (NPV, 3.17) rather than adjusted present value (APV, 1.09). Furthermore, they do so by discounting cash flows at the WACC (3.25). As shown by Miles and Ezzell (1980), the WACC is a tax adjusted discount rate; it implicitly accounts for the interest tax shield. Given a constant leverage ratio, Miles and Ezzell show that discounting at the WACC gives a levered valuation that is equivalent to that of a correct implementation of the two-step APV procedure.[12] In other words, the "NPV" one gets by discounting at the WACC can also be viewed as an "APV" that is calculated in one step rather than two. The survey responses suggest that this is not necessarily well understood.

Panel C takes a closer look at how well survey respondents understand valuation using the WACC. Because it contains an adjustment for the interest tax shield, the WACC is sensitive to leverage.[13] Thus, unless the project or firm that is being valued will maintain a constant debt to value ratio, one needs to recalculate the WACC every year in the "DCF

[12]To be clear, we are referring to the standard "textbook" formula: $\text{WACC} = (E/V)r_e + (D/V)r_d(1 - T_c)$, where $E$, is the market value of equity, $D$ is the market value of debt, $V = E + D$, $r_e$ is the "cost of equity," $r_d$ is the "cost of debt," and $T_c$ is the corporate tax rate. The factor $(1 - T_c)$ reflects the tax deductibility of interest payments. Adjusted present value is: $\text{APV} = \text{NPV} + \text{PV(TS)}$, where PV(TS) is the present value of the tax shield arising from the tax deductibility of interest payments. This is analogous to the expression $V_L = V_U + \text{PV(TS)}$, where $V_L$ is levered (actual) firm or project value and $V_U$ is the unlevered value. See, for example, Miles and Ezzell (1980), Cooper and Nyborg (2007 or 2008), or a corporate finance textbooks such as Brealey, Myers, and Allen (2013).

[13]Except in the trivial case that the net tax advantage to debt is zero, as in Miller's (1977) famous equilibrium. See, e.g., Miles and Ezzell (1980), Taggart (1991), Cooper and Nyborg( 2006, 2007 or 2008) for further discussion.

spreadsheet" based on projected debt levels and project (or firm) values. This is difficult to do correctly. Respondents exhibit a limited understanding of this problem. Only 48% of respondents say that they always or almost always take debt policy into account when using DCF, with the average strength of response being 2.19. Interestingly, valuation professionals with higher education levels are not different in this respect. However, there is some variation among the professions. In particular, private equity professionals are less inclined to let debt policy affect their choice of DCF approach ($1.79^b$). That only around half of the survey respondents seem to recognize the importance of debt policy in the implementation of a DCF valuation suggests a less than perfect understanding of the effect of tax shields. Potential confusion among survey respondents regarding the WACC, debt policies, and tax shields is studied in more detail in Subsection 5.4.

**Summary: Education vs Profession (Table 6)**

With respect to the impact of profession versus education level, there are 21 significant means in the profession subpanels as compared with 7 in the education subpanels in Table 6. In addition, Panel D shows that for regression specification 2, there are 12 significant coefficients in the profession block as compared with 4 in the education block. This is in line with our findings in previous sections that profession matters more than the level of education.

## 5.2 Forecasting horizon and terminal value

Anyone using DCF to value projects or firms would be expected to be familiar with the importance of the forecasting horizon and the terminal value. In this subsection, we take a look at this. Using DCF and discounting at the WACC, the gross (levered) present value of a project can be written

$$V = V_H + V_T \equiv \sum_{t=1}^{T} \frac{C_t}{(1+\text{WACC})^t} + V_T, \tag{4}$$

where $C_t$ is the all-equity after corporate tax cash flow in year, or period, $t$, $T$ is the forecasting horizon, $V_H$, is value of cash flows up to and including the forecasting horizon, and $V_T$ is the terminal value, that is, the present value of cash flows materializing after date $T$. For illustrative purposes we are assuming that $D/V$ is constant over time so that

we can discount at a single, time invariant WACC.[14]

**Insert Table 7 here.**

Table 7 shows valuation professionals' choices of $T$ and method for estimating $V_T$. We see in Panel A that the most common choice of forecasting horizon is five years, with 122 of 222 respondents naming this as their favored option. Only investment bankers favor a longer horizon, namely ten years. With respect to calculating $V_T$, Panel B reveals that the overwhelmingly most popular method for estimating $V_T$ is the Gordon growth model. Seventy-eight percent of respondents use this method almost always or always, with the strength of response on our 0–4 point scale being 2.99. This is the favored choice among all professions (except private equity) and educational levels. Private equity professionals prefer using multiples.

Using the Gordon growth model, $V_T$ in (4) can be written

$$V_T = \frac{C_T(1+g)}{\text{WACC} - g}, \tag{5}$$

where $g$ is the growth rate of cash flows *in perpetuity*.[15] The growth rate, $g$, is thus a crucial input into a valuation using DCF in practice. Panel C reports that the most popular choice of $g$ is 2%, with an overall average strength of response of 2.20. Fifty-six percent set $g = 2\%$ almost always or always. The next most popular choices are the inflation (2.16) and GDP growth (1.96) rates. There is some variation across the different subpopulations. For example, private equity professionals prefer the inflation rate, while CFAs prefer the GDP growth rate.

**Summary: Education vs Profession (Table 7)**

With respect to the relative importance of profession versus education, the "score" in Table 7 is as follows. Significant means: profession 19, education 12. Significant regression coefficients (specification 2): profession 11, education 5. Thus, the overall picture is still that profession matters more than education with respect to deviations from the norm.

We close this subsection with an example illustrating the practical significance of the

[14]This ignores term structure effects and forecastable time varying risk premia.

[15] For simplicity, in (5) we are assuming that $D/V$, and, therefore, WACC, is constant in perpetuity. Possible time variation in the WACC arising from the term structure of interest rates or time varying risk premia is ignored.

forecasting horizon and terminal value. In particular, we are interested in the contribution of the terminal value, $V_T$, to the total gross value, $V$, in (4), as a function of the forecasting horizon, $T$, and terminal value growth rate, $g$. To do this, we first simplify the expression for the forecasting horizon value, $V_H$, in (4), by assuming a constant growth rate over this period. In a DCF valuation in practice, analysts typically assume that cash flows grow over the forecasting horizon.[16] In our example, we allow the forecasting horizon growth rate to be different to the terminal value growth rate. Typically one might think that cash flows grow at a larger rate initially, as the firm or project is in its first growth spurt. Eventually, as competitive advantage is reduced, growth rates would be expected to subside. The fraction $V_T/V$ is then

$$\frac{V_T}{V} = \frac{PV(\textit{Growing perpetuity starting in } T \textit{ years})}{PV(\textit{Growing } T\textit{-year annuity}) + PV(\textit{Growing perpetuity starting in } T \textit{ years})}. \quad (6)$$

Using (5) and the formula for a growing annuity with a growth rate of $h$, (6), can be written[17]

$$\frac{V_T}{V} = \frac{1}{1 + \frac{1+h}{1+g}\frac{\text{WACC}-g}{\text{WACC}-h}\left[\left(\frac{1+\text{WACC}}{1+h}\right)^T - 1\right]}. \quad (7)$$

Table 8 lists values for the percentage of the total gross value that is attributable to the terminal value as a function of forecasting horizon, $T$, forecasting period growth rate, $h$, WACC, and terminal value growth rate, $g$. We consider forecasting horizons of five and ten years, $g$'s of zero, two, and four percent, WACCs of eight and ten percent, and $h$'s of two, four, and six percent. The numbers in bold indicate the values for the most commonly used scenario in practice as found by our survey, namely a five year forecasting horizon and a 2% terminal value growth rate.

**Insert Table 8 here.**

Using the parameter values in Table 8, the terminal value accounts for 69-77% of the total value. If we were to reduce the WACC to reflect today's low interest rates, this

[16] This statement is based on our experience. We did not include questions about this in the survey.

[17] Using the WACC as the discount rate, the present value of a T-year annuity growing at the rate of $h$ and with a year 1 cash flow of $C_1$ is

$$C_1\left[\frac{1}{\text{WACC}-h} - \frac{(1+h)^T}{(\text{WACC}-h)(1+\text{WACC})^T}\right].$$

Note also that, in this scenario, $C_T = C_1(1+h)^{T-1}$.

would be even larger. An implication is that in the hands of valuation professionals, *DCF is almost reduced to being just another multiples exercise*; roughly seventy percent of the value is given by the forecasted cash flow in six years multiplied by $1/(\text{WACC} - g)$. As seen in Table 8, the multiples interpretation of DCF fits less well using a longer forecasting horizon. However, even setting this to ten years, the terminal value accounts for 47-61% of the total value (for $g = 2\%$). The examples in Table 8 thus underscore the great significance of the forecasting horizon and terminal value. The way DCF is implemented by valuation professionals means that this technique is, in practice, not far from being just another multiples method.

## 5.3 Cost of capital

Table 9 reports on how respondents calculate cost of capital. Starting with the cost of debt in Panel A, we see that the most popular approach is a riskfree rate plus a spread (based on rating and/or duration). This is used by 72% of respondents almost always or always, with the overall average strength of response being 2.77. With respect to the cost of equity, Panel B reveals that 76% of respondents use the CAPM almost always or always, the overall average score being 2.98. No other method comes close. Notably, only 4% of respondents use the Fama and French (1993) three-factor model that is so popular in academic research. The cost of equity is typically viewed as being represented by a riskfree rate plus a risk premium (as in the CAPM). Panel C shows that valuation professionals typically use longer term treasury securities as their riskfree rate. Only asset managers differ in this respect, having a preference for using swap rates ($2.71^a$).

**Insert Table 9 here.**

While not tabulated, the survey also asked about what market risk premium respondents typically use. The average is 5.4%, with little by way of variation across subpopulations with different regional foci. There is some variation among the professions. The highest average is among private equity professionals (5.7%), while the lowest is among asset managers (4.6%).[18]

**Summary: Education vs Profession (Table 9)**

[18]But the number of asset managers responding to this question is small.

There is a fair amount of "harmony" across the different profession and education groups with respect to their favored approach to calculating the cost of capital. There are only 6 and 4 significant regression coefficients (specification 2) in the profession and education blocks, respectively. With respect to significant means coefficients, the respective numbers are 16 and 20, but the most popular choices are consistent across professions and educational levels. There are only two cases in the profession block and one case in the education block where these differ.

## 5.4 WACC and interest tax shields: Implementation and confusion

As seen in Subsection 5.1, there appears to be some confusion among survey respondents with respect to the topic of WACC and interest tax shields. As noted, when there is a net tax advantage to debt, WACC is sensitive to leverage. *Ceteris paribus*, WACC is decreasing in leverage because it incorporates the interest tax shield. In this subsection, we explore the depth of survey respondents' understanding of this basic result. This matters because, empirically, interest tax shields are arguably economically significant. Graham (2000) estimates that they account for around 5-10% of firm value.

In a typical DCF valuation, one first computes the cost of capital (the WACC, say) based on the financial characteristics of comparables. When using the WACC, one needs to use market based weights of the comparables to compute their WACCs and then convert this to a WACC appropriate for the leverage ratio relevant for the project at hand. This second step involves releveraging the WACC of the comparables to the target leverage ratio of the project or firm being valued. This procedure can be carried out using the Miles and Ezzell (1980) formula for tax-adjusted discount rates and its extensions to investor taxes in Taggart (1991), risky debt in Cooper and Nyborg (2008), and positive default recovery rates in Molnár and Nyborg (2013).

**Insert Table 10 here.**

Table 10, Panels A and B examine how well this is understood by our valuation professionals. Panel A shows that 57 out of 201 respondents, or approximately 28%, incorrectly use target weights when calculating the WACCs of comparables. Panel B reveals an even

larger confusion, with half of the respondents incorrectly using market weights when calculating the WACC of the to-be-valued project or firm. To the defense of the respondents, in Panel B it may be that they are thinking of the valuation of a firm whose capital structure will be the same going forward as it has currently.

That there is substantial confusion among valuation professionals regarding the WACC and tax shields is also apparent in Panel C. Only 31% of respondents report that they take future changes in capital structure into account when discounting using the WACC. The overall average score is a mere 1.47. A whopping forty percent never adjust WACC for anticipated changes in capital structure. With respect to the flows-to-equity method, where the discount rate is even more sensitive to capital structure (Esty 1999, Cooper and Nyborg 2010), only 15% take future changes in capital structure into account almost always or always. Half of the respondents never take it into account. Surprisingly, respondents with MBAs, CFAs or PhDs are just as confused about the correct usage of the WACC as other respondents. However, investment bankers are marginally less confused than others, with their score for adjusting the WACC according to future capital structure being $1.96^a$.

While WACC is complicated to implement when capital structure is expected to vary over time, the two-step APV procedure is ideally suited to such a scenario since it does not require recalculation of the cost of capital. Nevertheless, only 44% of respondents use this approach sometimes to deal with changes to capital structure – and only 15% do so almost always or always. The strength of response is a mere 0.94. While there is some variation in this figure across professions, there is no statistically significant variation across education levels.

**Summary: Education vs Profession (Table 10)**

Overall, in the education block, there are no significant means or regression coefficients (specification 2) in Table 10. In the profession block, there are 9 significant means and 4 significant regression coefficients.

**Insert Table 11 here.**

While APV is not commonly used among the survey respondents, Table 11 nevertheless takes a look at how they deal with tax shields when they use the two-step APV procedure. The key issue that is being explored is whether respondents understand that the appropriate discount rate for the interest tax savings depends on debt policy (see, e.g.,

Brealey, Myers, and Allen 2013 or Cooper and Nyborg 2007). Under a constant debt to value ratio, the appropriate discount rate for future tax shields is the all equity opportunity cost of capital, $R_u$ (Miles and Ezzell 1980). Under a deterministic debt schedule, Cooper and Nyborg (2008, 2010) show that it is appropriate to discount tax shields at the debt's yield. This result is not incorporated in most textbooks. However, what is well communicated in textbooks is that when a project supports a constant amount of debt, $D$, interest tax savings should be discounted at the cost of debt, leaving the standard formula, PV(TS) = $DT_c$ (assuming corporate taxes only).[19] The questions reported on in Table 11 ask whether respondents typically discount interest tax savings at $R_u$, $R_d$ (cost of debt), or take into account debt policy in their choice of discount rate. We also ask whether respondents take into account the stability of the cash flows that will be used to service the debt. Highly variable cash flows may make the tax savings more risky.

As seen in the table, there is little by way of conviction in survey participants' answers. The most popular choice is $R_u$, with an overall average score of only 1.18. But the correct choice is that it depends on the debt policy of the firm (or project).[20] The irony of $R_u$ being the most popular choice is that this is only correct if $D/V$ is constant, in which case it would be easier to incorporate the tax shields directly into the valuation in one step using the WACC. The answers here support the view that respondents do not fully understand tax shields or how to calculate APV correctly.

Panel B shows that valuation professionals almost never consider personal taxes when estimating the present value of the tax shield. Given how much confusion exists with respect to basic results relating to the interest tax shield, it is not surprising that more advanced issues such as the effect of personal taxes are not taken into account.

**Summary: Education vs Profession (Table 11 and all multiperiod tables)**
Once again, in Table 11 there is little by way of statistical significance in means and regression coefficients in either the profession or education blocks. For means, we have profession 9, education 3. For regression coefficients (specification 2), we have profession 3, education 1. Overall, for the multiperiod questions (Tables 6, 7, 9-11), the score is: Profession 73, Education 42 (means) and Profession 36, Education 14 (regression coefficients).

[19] As is well known, this formula is, strictly speaking, only correct if the debt is riskfree, since the tax saving is given on the paid interest and not on the expected rate of return of the debt.

[20] See, e.g., Cooper and Nyborg (2006).

## 5.5 Profession versus education: Overall review and summary

Table 12 adds up the profession versus education scores over all tables thus far in all sections (Tables 2, 3, 5-7, 9-11). The results from the regressions, summarized in Panel A, shows that there is substantially more variation across the profession as compared with the education subgroups.

**Insert Table 12 here.**

Focusing on regression specification 2, the educational subpopulation with the most significant regression coefficients (at conventional levels) is the BA group, with 10. By way of comparison, the private equity group have 33 significant coefficients, with consultants and asset managers having 25 and 22, respectively. Overall, there are 80 significant regression coefficients in the profession block as compared with only 26 in the education block. That profession matters more than educational level is borne out by the number of significant means. As seen in Panel B, there are 123 out of 372 in the profession block but only 54 out of 465 in the education block. It is almost surprising to see how inconsequential a valuation professional's educational level is.

Our findings support the sociological hypothesis that there are valuation cultures specific to different professions. This may also help explain respondents' confusion with respect to the WACC, APV, debt policies, and tax shields. It is difficult to break away from an ingrained culture with respect to how things are done. Dealing with tax shields correctly is relatively intricate and therefore easily forgotten if not regularly practiced.

The incorrect application of DCF is likely to lead to incorrect valuations and, as a consequence, a misallocation of capital in the economy. This is a challenge for finance education. Our survey findings suggest that to rectify this, better education at valuation professionals' places of work is required.

# 6 Valuation purpose and cluster analysis

It is possible that our findings above on the importance of the profession can be explained by variations in the purpose of valuation across the professions. This possibility is investigated in this section. We start by reporting on the extent to which survey respondents in the different professional subgroups have different valuation purposes. This is done by

reporting mean response strengths to the individual components of the valuation purpose variables and also by using cluster analysis. In addition, we employ cluster analysis to study the effect of the purpose of valuation within different professional subgroups.

## 6.1 Valuation purposes across professions

Table 13 summarizes our findings on valuation purposes across the different professional groups. The table follows the same basic pattern as the baseline Table 2, but without the educational and experience level blocks. The eleven individual valuation purpose characteristics are separated into three sets (panels), namely, type of investment, type of transaction, and role. Within each of these sets, the survey also allowed respondents to name other categories, but these turn out to be relatively unimportant (as seen in Table 13.)

**Insert Table 13 here.**

Panel A focuses on the type of investment; project finance, listed firms, unlisted firms, real estate, or "other." As seen, most survey respondents are involved in valuing either listed or unlisted firms, with the overall strength of response for these two choices being 2.66 and 2.83, respectively. Respondents are to a much lesser extent involved with project finance (0.79), real estate (0.72), or "other" (0.77). Consultants' and private equity professionals' most popular choice is unlisted firms ($3.38^a$ and $3.67^a$, respectively), whereas that of investment bankers and asset managers is listed firms ($3.96^a$ and $3.32^a$, respectively).

Panel B reports on the type of transaction; mergers and acquisitions, investment decisions, going public, going private, or other. The most popular choice in the population as a whole is investment decisions (3.12), followed by mergers and acquisitions (2.44) which is also the most popular choice among consultants ($3.27^a$). For the less popular choices, investment bankers and asset managers are relatively more involved with going public transactions ($1.83^a$ and 1.24, respectively) than going private ones ($0.65^a$ and $0.75^b$, respectively), while for consultants and private equity professionals, it is the reverse ($1.12^b$ and $1.02^c$ versus $1.56^a$ and 1.51, respectively).

Panel C reports on whether survey respondents are typically in an advisory role, on the buy side, on the sell side, or other. As seen, consultants are most often in an advisory

role ($3.09^a$), investment bankers are on the sell-side ($3.99^a$), and private equity professionals and asset managers are typically on the buy-side ($3.33^a$ and $3.71^a$, respectively). However, consultants, for example, are also often on the buy or sell side ($1.93^a$ and $2.30^b$, respectively).

In conclusion, while Table 13 shows that there are fairly strong commonalities in what the different professions emphasize with respect to valuation purposes, there are also distinct differences. These differences in valuation purpose may potentially lie behind some of the inter-profession variation we have found with respect to how valuation experts go about the business of valuation. However, it is not possible for us to control for all eleven valuation purpose characteristics in our regressions because of multicollinearity. We cannot separate out the effect of, say, listed (versus unlisted) firms, from the effects of other characteristics. Our approach is, therefore, to deal with this using cluster analysis.

## 6.2 Cluster analysis: Valuation purpose based clusters

Cluster analysis reduces the valuation purpose dimensionality through the formation of groups, or clusters, comprised of individual survey respondents with similar valuation purpose characteristics. Different clusters will, therefore, also be distinct from each other with respect to valuation purpose. This approach means that when we come to examine the effect of the valuation purpose on survey respondents' choice of valuation techniques, we will not examine the effect of individual valuation purpose characteristics, but rather the combined effect of set of affiliated characteristics.

A feature of cluster analysis is that the data largely "speaks for itself" with respect to how individuals are assigned to different clusters.[21] In our setting, individuals are assigned to clusters based only on their proximity to each other with respect to the eleven valuation purpose characteristics asked about in the survey and reported on in Table 13. The distribution of professions over the clusters, therefore, provides a simple gauge of the extent to which different professions have different valuation purpose profiles.

To form clusters, each survey respondent is initially represented (as one observation) by an eleven-dimensional vector of his/her responses on our 0–4 point scale to the eleven valuation purpose questions. To measure the proximity between observations (and clusters),

[21] See, e.g., Rencher and Christensen (2012) for a detailed exposition of cluster analysis.

we use the Euclidean distance.[22]

From our full sample of 272 respondents, we drop observations with more than four missing characteristics, which leads to a new, reduced sample of 222. Missing values in this sample are substituted by the corresponding attribute value of the most similar complete object in the dataset (K-nearest-neighbor method with K=1).[23]

To form clusters, we use the hierarchical agglomerative clustering method (Rencher and Christensen 2012). This is a sequential approach where, in each step, the two closest clusters are merged to form a new, larger cluster. Thus the number of clusters shrinks with each step and the clusters grow larger.

Closeness is measured, and clusters are formed, using Ward's linkage method. This method calculates the dissimilarity between two clusters as the increase in the sum of squared distance (or, error), SSE, from the mean cluster vectors from joining two clusters. Specifically, if we combine two clusters $A$ and $B$ into a single cluster $AB$, then the increase, $I_{AB}$, is defined as:

$$I_{AB} = \text{SSE}_{AB} - (\text{SSE}_A + \text{SSE}_B) \tag{8}$$

where $\text{SSE}_A = \sum_{i=1}^{n_A}(\mathbf{y}_i - \bar{\mathbf{y}}_A)'(\mathbf{y}_i - \bar{\mathbf{y}}_A)$; $\text{SSE}_B = \sum_{i=1}^{n_B}(\mathbf{y}_i - \bar{\mathbf{y}}_B)'(\mathbf{y}_i - \bar{\mathbf{y}}_B)$; $\text{SSE}_{AB} = \sum_{i=1}^{n_{AB}}(\mathbf{y}_i - \bar{\mathbf{y}}_{AB})'(\mathbf{y}_i - \bar{\mathbf{y}}_{AB})$; $\bar{\mathbf{y}}_A = \sum_{i=1}^{n_A}\mathbf{y}_i/n_A$; $\bar{\mathbf{y}}_B = \sum_{i=1}^{n_B}\mathbf{y}_i/n_B$; $\bar{\mathbf{y}}_{AB} = (n_A\bar{\mathbf{y}}_A + n_B\bar{\mathbf{y}}_B)/(n_A + n_B)$; and $n_A, n_B$, and $n_{AB} = n_A + n_B$ are the number of observations (individuals) in $A, B$, and $AB$ respectively. Thus, in each step, Ward's method joins the two clusters that minimize the increase in SSE.

As a first piece of analysis, we set the hierarchical agglomerative algorithm to produce four clusters. We do this because there are four professional groups in our sample and we wish to examine the extent to which they also represent different valuation purposes. We are interested in the distribution of the four professions across the four clusters.

**Insert Figure 2 here.**

Figure 2 shows the dendrogram produced by the algorithm. Below each of the final four clusters, we list the number of individuals, by profession, that comprise the cluster. It turns out that survey respondents cluster by professions. From left to right: Cluster 1

[22]The Euclidean distance between two vectors $\mathbf{x} = (x_1, x_2, ..., x_p)'$ and $\mathbf{y} = (y_1, y_2, ..., y_p)'$ is defined as $d(\mathbf{x}, \mathbf{y}) = \sqrt{(\mathbf{x} - \mathbf{y})'(\mathbf{x} - \mathbf{y})} = \sqrt{\sum_{j=1}^{p}(x_j - y_j)^2}$.

[23]For more information about nearest-neighbor method see, e.g., Hruschka et al. (2003).

consists of 46 (out of 50) investment bankers and one consultant. Cluster 2 consists of most private equity professionals and asset managers, joined by one consultant. Clusters 3 and 4 represent two consultant-dominated clusters. They also include the leftovers from Clusters 1 and 2 of the three other professions. The conclusion is, therefore, that the different professions have different valuation purpose profiles. These different profiles may contribute to the differences in valuation techniques across the professions seen in previous sections. Still, it is also clear from the dendrogram that there is some heterogeneity within the professions. Consultants, for example, are essentially split into two groups. From the analysis in this subsection, it is unclear whether the inter-profession differences in valuation techniques observed in Sections 3–5 are fully (or mostly) attributable to differences in valuation purpose. To address this question, further analysis is required.

## 6.3 Within-profession clusters and regression analysis

To examine the importance of the valuation purpose on the choice of valuation technique, in this section we carry out an analysis based on within-profession clusters. Asset managers are excluded from this analysis because of their small number among the survey respondents. For the other three professions, we run, individually, the same hierarchical agglomerative cluster algorithm as in the previous subsection, but with the algorithm now set to produce two clusters per profession. The within-profession clusters are then used in two sets of regression analyses, as discussed below.

**Insert Table 14 here.**

For each pair of within-profession clusters, Table 14 lists the means of the eleven valuation purpose characteristics and tests for differences. Starting with consultants, we see that the means are statistically significantly different (1% level) for nine of the eleven characteristics. Thus, the two populations produced by the cluster analysis are significantly different in terms of their valuation purpose. Cluster 1 can be viewed as consisting of generalists, with a high strength of response for a broad set of valuation purposes. Cluster 2 can be viewed as specialists, whose focus is on unlisted firms (3.51), mergers and acquisitions (3.18), and on being in an advisory role (2.87). The generalists also have a high strength of response on these characteristics as well as on listed firms, investment

decisions, and going private and are often on either the buy or sell side (all 2.00 or higher).

For investment bankers, the same pattern repeats; Cluster 1 consists of generalists and Cluster 2 of specialists. Seven of the eleven pairs of valuation purpose means are statistically significantly different (1% level). The specialists focus on listed firms (3.93) and investment decisions (3.79) and are on the sell side (4.00). The generalists are also involved with unlisted firms, mergers and acquisitions, and going public and are relatively often in an advisory role (all 1.95 or higher)

Private equity professionals are also clustered into generalists (Cluster 1) and specialists (Cluster 2). The specialists focus on unlisted firms (3.58) and investment decisions (3.16) and are typically on the buy side (3.28). The generalists also touch listed firms and mergers and acquisitions and are sometimes on the sell-side (all 1.81 or higher). The overall conclusion thus far is that there are distinct differences in valuation purpose characteristics among professionals within the same profession.

To examine the importance of the purpose of valuation within each profession, next we run within profession regressions on all 98 questions in Tables 2, 3, 5–7, and 9–11 as follows:

$$y_{ij} = \beta_{0j} + \beta_{1j} Clus1_i + \beta_{2j} MBA_i + \beta_{3j} HExp_i + \beta_{4j} LS_i + \varepsilon_{ij}, \tag{9}$$

where $y_{ij}$ is respondent $i$'s answer to question $j$. $Clus1$ is an indicator variable for Cluster 1 (within profession generalists). The other explanatory variables are indicator variables as defined earlier. Because these regressions are within-profession regressions, they allow us to examine the importance of different valuation purpose profiles while controlling for the profession.

The results are summarized in Table 15. For each profession, the table reports on the number of statistically significant coefficients (10% or better) for each variable for all questions in Tables 2, 3, 5–7, and 9–11 on a table by table basis. The key result is that the valuation purpose is relatively unimportant with respect to explaining the choice (and implementation) of valuation technique. $Clus1$ is significant in only 10, 16, and 9 regressions for consulting, investment banking, and private equity, respectively. This is about a third to a half of the number of significant coefficients for the individual professions in the same kinds of regressions, as reported in Table 12. This is especially noteworthy for consultants where the difference between the two clusters is so strong and clear (as

seen in Figure 2). The findings summarized in Table 15 suggest that the importance of the professional subgroups with respect to the choice of valuation technique documented in previous sections is not driven by differences in the purpose of valuation.

To examine this further, we also run regressions similar to those in Sections 3–5, but where we add indicator variables for the three specialist clusters, the *Clus*2's just described. In particular, we run

$$y_{ij} = \beta_{0j}+\beta_{1j}Cons_i+\beta_{2j}IB_i+\beta_{3j}PE_i+\beta_{4j}MBA_i+\beta_{5j}HExp_i+\beta_{6j}LS_i+\beta_{7j}Clus2_i+\varepsilon_{ij}, \quad (10)$$

where *Clus*2 refers to either consultants, investment bankers, or private equity professionals. In other words, (10) is run three times, one time for each of the three *Clus*2's. We do the same for the second specification:

$$\begin{aligned} y_{ij} = \quad & \beta_{0j} + \beta_{1j}Cons_i + \beta_{2j}IB_i + \beta_{3j}PE_i + \beta_{4j}BA_i + \beta_{5j}MA_i \\ & + \beta_{6j}PhD_i + \beta_{7j}CFA_i + \beta_{8j}HExp_i + \beta_{9j}LS_i + \beta_{10j}Clus2_i + \varepsilon_{ij}. \end{aligned} \quad (11)$$

The findings are in Table 16. We see that there are substantially more significant profession coefficients than *Clus*2 (valuation purpose) coefficients. For either specification, the ratios of significant profession to valuation purpose coefficients are approximately: two to one (consulting), three to one (investment banking), and four to one (private equity). This is in line with the results above in Tables 12 and 15. It shows that the purpose of the valuation does not explain the inter-profession differences in valuation approach documented in Sections 3–5. Given the profession, the purpose of the valuation has a relatively small impact on the choice of valuation technique.

Our findings in this section can be viewed as strengthening support for the sociological hypothesis that the different professional subgroups have different valuation cultures. Within the professions (Table 15), the valuation purpose is relatively unimportant, and this is also so in the between professions regressions (Table 16). It bears emphasis that support for the sociological hypothesis is arguably not tied to the extent to which differences in valuation approaches can be explained by differences in valuation purposes, since there is no theoretical basis for using different approaches depending on the underlying valuation purpose. Still, that the purpose of valuation is as unimportant as it is, adds weight to the sociological hypothesis. It means that the valuation cultures of the different professions only have limited basis in the kind of arenas they are active in or the role they

take on in the valuation process. In that sense, the particular valuation approach profile that is dominant within a specific profession appears to be largely arbitrary. It is most plausibly explained by a culture of doing things a particular way. Further work is required to understand how such valuation cultures originate and evolve and what their impact may be on the allocation of capital and resources in the economy.

# 7 Concluding remarks

In this paper, we have used a survey approach to learn about how valuation professionals go about valuing investment projects or firms. The survey asks questions relating to what methods the professionals use and how they implement these methods. Some questions are designed to tease out confusion that may exist, especially in the context of interest tax shields. Importantly, background questions on the survey respondents have allowed us to examine the impact of their professional subgroups, educational levels, experience, and typical valuation purposes on their approaches to valuation.

While we find, as one would expect, that there are substantial commonalities in the choice of valuation technique, there is also a fair amount of variation. In particular, the evidence is that: 1. Valuation approaches vary across professions. 2. There are not many differences across education levels. 3. Experience has almost no significant effect. 4. The purpose of the valuation has limited effect on the choice of valuation method. While different professions have different valuation purpose characteristics, this does not explain the systematic differences we document across professions. 5. There is much confusion with respect to interest tax shields and the WACC. Higher educational levels do not alleviate this confusion.

These findings support what we call the sociological hypothesis, namely that there are different valuation cultures within the different subgroups of valuation professionals. These apparent valuation cultures have only limited basis in the valuation purposes that dominate within the professions. Unfortunately, our survey can not shed light on the origin of such valuation cultures.

Our finding of systematic differences in valuation approaches across the professions contributes to the broader behavioral finance literature. There is substantial evidence of various behavioral biases across individual investors and other agents in the broader finance

arena (see, e.g., Odean 1999, Barberis and Thaler 2003, or, for a review, Subrahmanyam 2007). There is also evidence that some of these biases may derive from direct contact with others (Hong, Kubik, and Stein 2004, Hvide and Östberg 2015). What we call the sociological hypothesis expands on the standard peer effect hypothesis, since the influence is hypothesized to come from the profession as a whole. While it is beyond this paper to comment on the mechanism through which different valuation cultures sustain themselves or propagate, the finding that there are systematic differences across professions that are not related to differences in educational levels, experience, or valuation purposes is clear.

Our findings mirror results from the social psychology literature and, in particular, the pioneering work of Harris (1998). In an interview in *Scientific American* in 2009, she summarizes her findings as follows: "I've put together a lot of evidence showing that children learn at home how to behave at home (that's where parents do have power!), and they learn outside the home how to behave outside the home. Parents matter much less, [...] a child's peer group is far more important." Analogously, our findings suggest that valuation professionals learn how to approach valuation in practice from their peers at work and the standards of their profession rather than from what they learned as advanced students at University.

The relative unimportance of education documented in this paper raises the question as to what the role of finance education, especially beyond the bachelor level, might be. Is it merely a side-show?

On a more basic and specific level, this paper contributes by documenting what the most popular valuation methodologies are among valuation professionals. Broadly speaking, we have seen that people use both multiples and discounted cash flows. While the theoretical foundation of the latter is highly developed – it is well explained in textbooks and substantially explored in the academic literature – there is much less by way of work on multiples. That multiples are so popular in practice, across the professions and all educational levels, suggest that it would be useful to have more research into their performance and how best to use them in practice.

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# Appendix

## Tables

Table 1: Overview of responses and selected sample.

Our final (selected) sample has 272 responses out of 4500 initial mailings. We drop all records which contain responses only for section 1 of the survey (preliminary questions) and keep all records with at least 2 (out of 5) questions completed in the Multiples section. "Complete" means at least 95% overall completeness across all 4 sections. "Partly complete" means a completeness rate of at least 30%. "Response rate" is the "Total" column as a percent of "Initial mailings." "% of sample" denotes the percentage of the indicated profession out of the total sample of 272.

| Profession | Initial mailings | Selected responses | | | Response rate | % of sample |
|---|---|---|---|---|---|---|
| | | Complete | Partly complete | **Total** | | |
| Consulting | 1132 | 54 | 59 | **113** | 10.0% | 41.5% |
| Investment banking | 1176 | 29 | 43 | **72** | 6.1% | 26.5% |
| Private equity | 1377 | 18 | 40 | **58** | 4.2% | 21.3% |
| Asset management | 815 | 4 | 25 | **29** | 3.6% | 10.7% |
| Total | 4500 | 105 | 167 | **272** | 6.0% | 100% |

Table 2: Choice of valuation approach.

This table reports results from the fourth part of the questionnaire (General questions on analysis approach). The row labelled "Full sample" provides the total number of respondents in the whole sample and the indicated subpopulations. Panels A - D correspond to sets of questions 30 - 33. The first block of columns represents results for the total number of participants (272). The first column gives the number of replies to each question; the second column gives the percentage of the replies that are from 1 to 4 (where 0 is "never" and 4 is "always"); the third column gives the percentage of the replies that are 3 or 4 ("almost always" or "always"); the fourth column shows the mean across all replies (on the 0 - 4 scale). The remaining columns are divided into three blocks, "Profession," "Education," and "Experience," within which each column provides the mean of the respective responses for the indicated subpopulation (e.g., Consulting, Investment Banking, etc.). Within each panel, the highest number in each column is indicated in bold. Within each panel-block we check whether the mean of each subpopulation is statistically different from that of the complement population (e.g., Cons. vs. IB, PE, and AM together) and indicate statistical significance at the 1%, 5%, and 10% level by ***a***, ***b***, and ***c***, respectively. Panel E reports the number of statistically significant coefficients at the 10% level or less from running the following regressions for each question in all preceding panels (except "Other")

Specification 1: $y_{ij} = \beta_{0j} + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} MBA_i + \beta_{5j} HExp_i + \beta_{6j} LS_i + \varepsilon_{ij}$,

Specification 2: $y_{ij} = \beta_{0}j + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} BA_i + \beta_{5j} MA_i + \beta_{6j} PhD_i + \beta_{7j} CFA_i + \beta_{8j} HExp_i + \beta_{9j} LS_i + \varepsilon_{ij}$,

where $y_{ij}$ is respondent $i$'s answer to question $j$. The RHS variables in the regression are defined in the text after equations (1, 2). The numbers of statistically significant coefficients for the variable *LS* are not provided in the table, but can be found as a summary for all regressions in Tables 2, 3, 5-7, 9-11 in Table 12. All significance tests are two-tailed.

"Cons.," "IB," "PE," and "AM" denote "Consulting," "Investment Banking," "Private Equity," and "Asset Management" respectively. "BA," "MA," "PhD," "MBA," and "CFA" denote "Bachelor," "Master," "Doctoral degree," "Master of Business Administration," and "Chartered Financial Analyst" respectively.

| | Replies | % 1-4 | % 3-4 | mean | **Profession** | | | | **Education** | | | | | **Experience** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cons. | IB | PE | AM | BA | MA | PhD | MBA | CFA | $\leq$ 10y | >10y |
| Full sample | 272 | | | | 113 | 72 | 58 | 29 | 52 | 37 | 17 | 123 | 36 | 103 | 168 |
| *Panel A: Valuation approach: frequency of use* | | | | | | | | | | | | | | | |
| Both Mult. and DCF | 194 | 94% | **76%** | **2.97** | **3.29**$^a$ | **3.12** | 2.03$^a$ | 2.88 | **3.03** | **3.46**$^a$ | **3.36** | 2.71$^a$ | **3.00** | **2.78**$^c$ | **3.09**$^c$ |
| Both, primarily Mult. | 178 | 87% | 47% | 2.18 | 2.12 | 2.24 | 2.17 | 2.36 | 2.82$^a$ | 2.04 | 2.08 | 2.09 | 1.92 | 2.16 | 2.19 |
| Both, primarily DCF | 173 | 83% | 46% | 2.12 | 2.33$^c$ | 2.61$^a$ | 0.90$^a$ | 1.75 | 1.97 | 2.50 | 2.27 | 1.96 | 2.19 | 1.80$^b$ | 2.33$^b$ |
| Only Multiples | 164 | 80% | 26% | 1.59 | 1.67 | 1.24$^b$ | 1.88 | 1.58 | 2.00$^b$ | 1.05$^a$ | 1.50 | 1.68 | 1.42 | 1.74 | 1.48 |
| Only DCF | 160 | 70% | 17% | 1.28 | 1.36 | 1.58$^b$ | 0.65$^a$ | 1.25 | 1.73$^a$ | 0.90$^b$ | 1.75 | 1.15 | 1.19 | 1.22 | 1.32 |
| Sensitivity | 182 | **95%** | 68% | 2.82 | 2.82 | 2.69 | **2.97** | **2.93** | 2.76 | 2.57 | 3.18 | **2.78** | 2.97 | **2.78** | 2.85 |
| Scenario | 175 | 92% | 57% | 2.46 | 2.42 | 2.32 | 2.75 | 2.58 | 2.25 | 2.21 | 2.73 | 2.55 | 2.52 | 2.51 | 2.43 |
| Sum-of-parts | 180 | 91% | 39% | 2.08 | 1.89$^b$ | 2.53$^a$ | 1.71$^c$ | 2.38 | 2.03 | 2.05 | 2.40 | 2.13 | 1.90 | 1.93 | 2.18 |
| *Panel B: Does industry affect valuation approach?* | | | | | | | | | | | | | | | |
| Yes | 199 | 92% | 50% | 2.33 | 2.37 | 2.31 | 2.21 | 2.44 | 2.46 | 2.56 | 2.36 | 2.28 | 2.14 | 2.38 | 2.30 |
| *Panel C: Does transaction type affect val. approach?* | | | | | | | | | | | | | | | |
| Yes | 190 | 93% | 34% | 1.97 | 1.95 | 2.02 | 2.03 | 1.79 | 2.14 | 1.88 | 2.15 | 1.88 | 2.17 | 2.04 | 1.93 |
| *Panel D: Reason for NOT using multi-period models* | | | | | | | | | | | | | | | |
| Time-consuming | 116 | 67% | 34% | 1.71 | 1.77 | 1.24$^b$ | 2.00 | 2.14 | 1.73 | 1.21 | **1.83** | 1.87 | 1.53 | 1.79 | 1.65 |
| CF uncertainty | 117 | **79%** | **51%** | **2.27** | **2.32** | **1.73**$^b$ | **2.57** | **3.13**$^b$ | **2.29** | **1.93** | 1.80 | **2.35** | **2.53** | **2.26** | **2.28** |
| Cost of cap. unc. | 112 | 73% | 39% | 1.87 | 1.81 | 1.71 | 2.13 | 2.00 | 1.73 | 1.64 | 1.80 | 1.80 | 2.50$^c$ | 2.14 | 1.69 |
| Other | 41 | 29% | 17% | 0.85 | 1.55 | 0.15$^a$ | 0.69 | 1.75 | 1.20 | 0.00$^a$ | 0.00$^a$ | 0.63 | 0.75 | 0.77 | 0.95 |
| *Panel E: Regressions. Significant coefficients. Stat. significant coefficients ($\leq$ 10%) out of 13:* | | | | | | | | | | | | | | | |
| Specification 1 | | | | | 3 | - | 6 | 2 | - | - | - | 1 | - | - | 0 |
| Specification 2 | | | | | 3 | - | 6 | 2 | 2 | 1 | 0 | - | 1 | - | 0 |

Table 3: Multiples

This table reports results from the second part of the questionnaire (Relative valuation). The general structure is the same as for Table 2. Panels A - C correspond to sets of questions 13 - 15. Three blocks of columns, "Profession," "Education," and "Experience" provide the mean (on the 0 - 4 scale) of the respective responses for the indicated subpopulation (e.g., Consulting, Investment Banking, etc.). Within each panel, the highest number in each column is indicated in bold. Within each panel-block, we check whether the mean of each subpopulation is statistically different from that of the complement population (e.g., Cons. vs. IB, PE, and AM together) and indicate statistical significance at the 1%, 5%, and 10% level by ***a***, ***b***, and ***c***, respectively. Panel D reports the number of statistically significant coefficients at the 10% level or less from running the following regressions for each question in all preceding panels (except "Other")

Specification 1: $y_{ij} = \beta_{0j} + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} MBA_i + \beta_{5j} HExp_i + \beta_{6j} LS_i + \varepsilon_{ij}$,

Specification 2: $y_{ij} = \beta_{0}j + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} BA_i + \beta_{5j} MA_i + \beta_{6j} PhD_i + \beta_{7j} CFA_i + \beta_{8j} HExp_i + \beta_{9j} LS_i + \varepsilon_{ij}$,

where $y_{ij}$ is respondent $i$'s answer to question $j$. The RHS variables in the regression are defined in the text after equations (1, 2). The numbers of statistically significant coefficients for the variable *LS* are not provided in the table, but can be found as a summary for all regressions in Tables 2, 3, 5-7, 9-11 in Table 12. All significance tests are two-tailed.

"Cons.," "IB," "PE," and "AM" denote "Consulting," "Investment Banking," "Private Equity," and "Asset Management" respectively. "BA," "MA," "PhD," "MBA," and "CFA" denote "Bachelor," "Master," "Doctoral degree," "Master of Business Administration," and "Chartered Financial Analyst" respectively.

| | Replies | % 1-4 | % 3-4 | mean | **Profession** | | | | **Education** | | | | | **Experience** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cons. | IB | PE | AM | BA | MA | PhD | MBA | CFA | $\leq$ 10y | >10y |
| Full sample | 272 | | | | 113 | 72 | 58 | 29 | 52 | 37 | 17 | 123 | 36 | 103 | 168 |
| *Panel A: Multiples* | | | | | | | | | | | | | | | |
| P/E | 266 | 85% | 49% | 2.26 | $2.02^b$ | **$3.11^a$** | $1.30^a$ | **$2.93^a$** | 2.42 | 2.30 | 2.44 | 2.12 | 2.42 | 2.14 | 2.33 |
| PEG | 257 | 72% | 21% | 1.38 | $1.20^b$ | $1.90^a$ | $0.83^a$ | $1.85^c$ | 1.39 | 1.29 | 1.94 | 1.28 | 1.44 | 1.25 | 1.46 |
| P/B | 261 | 72% | 24% | 1.50 | $1.17^a$ | $1.93^a$ | $0.98^a$ | $2.64^a$ | 1.63 | 1.32 | 1.41 | 1.39 | $1.97^b$ | $1.30^b$ | $1.63^b$ |
| P/S | 257 | 60% | 14% | 1.09 | 1.08 | 1.16 | $0.72^a$ | $1.68^a$ | 0.94 | 1.36 | 1.53 | 0.99 | 1.22 | $0.91^b$ | $1.21^b$ |
| P/CF | 257 | 77% | 31% | 1.75 | $1.53^b$ | $2.01^b$ | 1.48 | $2.50^a$ | 1.69 | 1.83 | 1.94 | 1.67 | 1.92 | 1.60 | 1.87 |
| EV/S | 257 | 79% | 28% | 1.70 | $1.97^a$ | 1.68 | $1.23^a$ | 1.64 | 1.56 | 1.83 | $2.47^a$ | 1.67 | 1.54 | 1.70 | 1.70 |
| EV/EBITDA | 267 | **95%** | **84%** | **3.34** | **$3.62^a$** | $3.09^b$ | **3.41** | $2.75^b$ | **3.29** | **3.53** | **3.24** | **3.41** | **3.11** | **3.46** | **3.27** |
| EV/EBITA | 259 | 82% | 51% | 2.32 | 2.40 | 2.09 | $2.77^a$ | $1.68^a$ | 2.12 | $1.86^b$ | 2.19 | $2.62^a$ | 2.29 | 2.36 | 2.28 |
| EV/EBIT | 258 | 88% | 59% | 2.55 | $2.84^a$ | $2.30^c$ | 2.67 | $1.71^a$ | 2.37 | 2.26 | 2.29 | $2.82^a$ | 2.29 | 2.59 | 2.51 |
| Ind.-specific | 253 | 87% | 47% | 2.27 | $2.45^c$ | 2.06 | 2.24 | 2.19 | 2.39 | 2.11 | $1.67^c$ | 2.39 | 2.14 | $2.44^c$ | $2.15^c$ |
| *Panel B: Multiples. Time aspect* | | | | | | | | | | | | | | | |
| Trailing | 265 | 89% | 55% | 2.53 | $2.74^b$ | $1.87^a$ | **$3.05^a$** | 2.29 | $2.90^b$ | 2.42 | 2.00 | 2.57 | 2.28 | $2.70^c$ | $2.42^c$ |
| 12m fwd | 268 | **96%** | **80%** | **3.13** | **3.11** | **$3.44^a$** | $2.90^c$ | **2.89** | **3.02** | **3.03** | **3.12** | **3.20** | **3.28** | **3.20** | **3.08** |
| 24m fwd | 262 | 84% | 37% | 2.04 | 2.02 | $2.59^a$ | $1.38^a$ | 2.04 | 2.08 | 1.81 | 2.35 | 2.03 | 2.14 | 1.90 | 2.14 |
| *Panel C: Impact of investment characteristics* | | | | | | | | | | | | | | | |
| Industry | 244 | **99%** | **89%** | **3.44** | **3.37** | **3.52** | **3.51** | **3.35** | **3.47** | **3.50** | **3.56** | **3.41** | **3.43** | **3.46** | **3.43** |
| Size | 242 | 87% | 41% | 2.17 | $2.35^b$ | $1.77^a$ | 2.31 | 2.13 | 2.02 | 2.18 | 1.94 | 2.20 | 2.46 | 2.31 | 2.08 |
| Transaction type | 238 | 88% | 38% | 2.10 | 2.24 | $1.87^c$ | 2.34 | $1.50^b$ | 2.05 | 2.00 | 2.18 | 2.10 | 2.34 | 2.13 | 2.08 |
| Account. manip. | 239 | 92% | 42% | 2.17 | 2.14 | 2.26 | 1.92 | $2.57^b$ | 1.95 | 1.97 | 2.19 | 2.24 | $2.49^c$ | $1.97^b$ | $2.28^b$ |
| Earn., marg. stab. | 243 | 97% | 70% | 2.84 | 2.82 | 2.92 | 2.84 | 2.70 | 2.93 | 2.71 | 3.06 | $2.69^b$ | $3.23^a$ | 2.84 | 2.84 |
| Cap. intensity | 241 | 93% | 59% | 2.51 | 2.46 | 2.52 | 2.53 | 2.70 | 2.56 | 2.32 | 2.50 | 2.54 | 2.60 | 2.51 | 2.51 |
| Stock liq. | 235 | 76% | 27% | 1.63 | $1.82^b$ | 1.57 | $1.26^b$ | 1.61 | 1.48 | 1.38 | 1.81 | 1.64 | 1.97 | 1.49 | 1.71 |
| Other | 107 | 28% | 14% | 0.74 | $1.17^c$ | 0.56 | 0.52 | 0.73 | 0.50 | 0.50 | 0.38 | 0.84 | 1.08 | 0.59 | 0.86 |
| *Panel D: Regressions. Significant coefficients. Stat. significant coefficients ($\leq$ 10%) out of 20:* | | | | | | | | | | | | | | | |
| Specification 1 | | | | | 8 | - | 8 | 4 | - | - | - | 3 | - | - | 1 |
| Specification 2 | | | | | 8 | - | 10 | 5 | 2 | 2 | 2 | - | 1 | - | 0 |

Table 4: Multiples. Example.

This table represents an example of valuation with multiples for Green Mountain Coffee Roasters (now known as Keurig). The valuation is carried out for three sets of comparables: (i) the Bloomberg comparables set (as of 14.02.2014 and 24.02.2015), (ii) the 50% largest in (i), by enterprise value, and (iii) the 50% smallest. For each comparables set, we calculate the average of each multiple and then apply it to the relevant earnings or cash flow figure of Keurig Green Mountain. For example, to estimate the enterprise value with P/E multiple we first calculate an estimated price, $\widehat{Price}$, of Keurig Green Mountain by multiplying its EPS by the average P/E for each set of comparables and then, calculate an estimated enterprise value of Keurig Green Mountain by using the definition in Bloomberg: $\widehat{EV} = \widehat{Price} \times N_{Sh} + Pref.Equity + Minority\ Int. + Tot.Debt - Cash\&Marktb.Securities - Other\ non\text{-}cash\ Adj.$, where $N_{Sh}$ is the number of shares of Keurig Green Mountain. The table reports valuation errors in absolute terms, i.e., $\mid EV_{true} - \widehat{EV} \mid$ in \$mill. The true enterprise value of Keurig Green Mountain was 15,900 \$mill on 14.02.2014 and 18,672 \$mill on 24.02.2015. Similar procedures are applied to all multiples presented in the table, all except P/B with trailing and forward cash flows. The numbers in bold represent the highest and the lowest valuation errors (in absolute terms).
On February 14, 2014 (Green Mountain), the comparables were Nestlé, Coca-Cola, PepsiCo, Mondelēz International, Danone, Associated British Foods, and General Mills in the "Large" group and Kerry Group, ConAgra Foods, Monster Beverage, Lindt&Sprüngli, Dr Pepper Snapple Group, Smucker's, Tata Global Beverages, and Dean Foods in the "Small" group. On February 24, 2015 (Keurig), the comparables were Nestlé, Coca-Cola, PepsiCo, Mondelēz International, Danone, Associated British Foods, General Mills, and Monster Beverage in the "Large" group and Dr Pepper Snapple Group, ConAgra Foods, Lindt&Sprüngli, Kerry Group, Smucker's, Tata Global Beverages, and Dean Foods in the "Small" group.

**Enterprise value valuation errors (in \$mill)**

| | **EV/EBITDA** | | **EV/EBIT** | | **P/E** | | **P/B** | **P/CF** | |
|---|---|---|---|---|---|---|---|---|---|
| | **Trail.** | **Forw.** | **Trail.** | **Forw.** | **Trail.** | **Forw.** | | **Trail.** | **Forw.** |
| *Panel A: Green Mountain at 14.02.2014* | | | | | | | | | |
| Bloomberg | 3,280 | 3,199 | 3,665 | 2,887 | 5,536 | 6,189 | 5,725 | 2,430 | 7,204 |
| Large | 3,289 | 2,865 | 3,601 | 2,434 | 5,788 | 6,398 | 6,498 | 5,423 | **7,765** |
| Small | 3,272 | 3,490 | 3,720 | 3,282 | 5,315 | 6,007 | 5,049 | **563** | 6,642 |
| *Panel B: Keurig at 24.02.2015* | | | | | | | | | |
| Bloomberg | 1,487 | 1,116 | 1,171 | 818 | 5,299 | 3,904 | 2,524 | 8,499 | 4,553 |
| Large | 1,606 | 182 | 2,069 | 315 | 4,793 | 3,535 | 831 | 8,383 | 3,142 |
| Small | 1,352 | 2,600 | **25** | 2,328 | 5,975 | 4,307 | 6,358 | **8,632** | 6,433 |

Table 5: Multiples. Comparables selection.

This table reports results from the second part of the questionnaire (Relative valuation). The general structure is the same as for Table 2. Panels A, B correspond to sets of questions 16, 17. Three blocks of columns, "Profession," "Education," and "Experience" provide the mean (on the 0 - 4 scale) of the respective responses for the indicated subpopulation (e.g., Consulting, Investment Banking, etc.). Within each panel, the highest number in each column is indicated in bold. Within each panel-block, we check whether the mean of each subpopulation is statistically different from that of the complement population (e.g., Cons. vs. IB, PE, and AM together) and indicate statistical significance at the 1%, 5%, and 10% level by ***a***, ***b***, and ***c***, respectively. Panel C reports the number of statistically significant coefficients at the 10% level or less from running the following regressions for each question in all preceding panels (except "Other")

Specification 1: $y_{ij} = \beta_{0j} + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} MBA_i + \beta_{5j} HExp_i + \beta_{6j} LS_i + \varepsilon_{ij}$,

Specification 2: $y_{ij} = \beta_{0}j + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} BA_i + \beta_{5j} MA_i + \beta_{6j} PhD_i + \beta_{7j} CFA_i + \beta_{8j} HExp_i + \beta_{9j} LS_i + \varepsilon_{ij}$,

where $y_{ij}$ is respondent $i$'s answer to question $j$. The RHS variables in the regression are defined in the text after equations (1, 2). The numbers of statistically significant coefficients for the variable $LS$ are not provided in the table, but can be found as a summary for all regressions in Tables 2, 3, 5-7, 9-11 in Table 12. All significance tests are two-tailed.

"Cons.," "IB," "PE," and "AM" denote "Consulting," "Investment Banking," "Private Equity," and "Asset Management" respectively. "BA," "MA," "PhD," "MBA," and "CFA" denote "Bachelor," "Master," "Doctoral degree," "Master of Business Administration," and "Chartered Financial Analyst" respectively.

| | Replies | % 1-4 | % 3-4 | mean | **Profession** | | | | **Education** | | | | | **Experience** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cons. | IB | PE | AM | BA | MA | PhD | MBA | CFA | $\leq$ 10y | >10y |
| Full sample | 272 | | | | 113 | 72 | 58 | 29 | 52 | 37 | 17 | 123 | 36 | 103 | 168 |
| *Panel A: What affects selection of comps* | | | | | | | | | | | | | | | |
| Bloomberg | 228 | 60% | 16% | 1.11 | 1.20 | $0.79^a$ | 0.93 | $1.91^a$ | 1.13 | 0.88 | 1.06 | 1.12 | 1.29 | 1.10 | 1.12 |
| Industry | 247 | **100%** | 89% | 3.45 | **3.48** | 3.55 | **3.40** | $3.09^b$ | **3.57** | 3.38 | 3.38 | 3.44 | 3.40 | 3.44 | **3.45** |
| Size | 244 | 96% | 55% | 2.49 | $2.64^b$ | 2.34 | 2.44 | 2.30 | 2.71 | $2.15^b$ | 2.53 | 2.56 | 2.40 | $2.70^a$ | $2.36^a$ |
| Rivals | 242 | 99% | **91%** | **3.48** | **3.48** | **$3.68^a$** | $3.31^c$ | **3.26** | 3.39 | **3.44** | **3.50** | **3.50** | **3.60** | **$3.58^c$** | $3.42^c$ |
| Age | 231 | 70% | 9% | 1.10 | 1.20 | $0.82^a$ | 1.15 | 1.36 | 1.24 | 0.91 | 1.06 | 1.15 | 1.03 | 1.03 | 1.14 |
| Exp. growth | 236 | 92% | 50% | 2.34 | 2.33 | 2.11 | $2.60^c$ | 2.45 | 2.09 | 2.41 | 2.19 | 2.43 | 2.47 | 2.27 | 2.38 |
| ROIC | 235 | 88% | 31% | 1.83 | $1.60^a$ | 1.95 | 1.73 | $2.70^a$ | 1.64 | 1.85 | $2.38^c$ | 1.83 | 1.82 | $1.59^b$ | $1.97^b$ |
| Stock liq. | 238 | 78% | 24% | 1.58 | $1.78^b$ | 1.53 | $1.17^a$ | 1.61 | 1.33 | 1.82 | 1.50 | 1.52 | 1.79 | 1.47 | 1.64 |
| Oth. qualit. aspects | 211 | 84% | 37% | 1.99 | 2.12 | 1.73 | 2.07 | 1.84 | $1.58^b$ | 2.25 | 2.29 | 2.00 | 2.13 | 1.90 | 2.05 |
| Other | 90 | 27% | 12% | 0.70 | $1.39^a$ | $0.37^c$ | $0.38^c$ | 0.50 | 0.63 | 0.88 | 0.86 | 0.62 | 0.92 | $0.31^a$ | $1.09^a$ |
| *Panel B: Average number of comps* | | | | | | | | | | | | | | | |
| | 186 | | | 8.30 | $9.13^a$ | 8.21 | $6.76^a$ | 7.33 | 8.90 | 8.54 | 10.43 | 7.85 | 7.72 | 8.22 | 8.36 |
| *Panel C: Regressions. Significant coefficients. Stat. significant coefficients ($\leq$ 10%) out of 9:* | | | | | | | | | | | | | | | |
| Specification 1 | | | | | 2 | - | 2 | 5 | - | - | - | 0 | - | - | 1 |
| Specification 2 | | | | | 2 | - | 3 | 5 | 0 | 0 | 1 | - | 0 | - | 1 |

Table 6: Multiperiod models.

This table reports results from the third part of the questionnaire (Multiperiod models). The general structure is the same as for Table 2. Panels A - C correspond to sets of questions 18 - 19a. Three blocks of columns, "Profession," "Education," and "Experience" provide the mean (on the 0 - 4 scale) of the respective responses for the indicated subpopulation (e.g., Consultants, Investment Bankers, etc.). Within each panel, the highest number in each column is indicated in bold. Within each panel-block, we check whether the mean of each subpopulation is statistically different from that of the complement population (e.g., Cons. vs. IB, PE, and AM together) and indicate statistical significance at the 1%, 5%, and 10% level by ***a***, ***b***, and ***c***, respectively. Panel D reports the number of statistically significant coefficients at the 10% level or less from running the following regressions for each question in all preceding panels (except "Other")

Specification 1: $y_{ij} = \beta_{0j} + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} MBA_i + \beta_{5j} HExp_i + \beta_{6j} LS_i + \varepsilon_{ij}$,

Specification 2: $y_{ij} = \beta_{0}j + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} BA_i + \beta_{5j} MA_i + \beta_{6j} PhD_i + \beta_{7j} CFA_i + \beta_{8j} HExp_i + \beta_{9j} LS_i + \varepsilon_{ij}$,

where $y_{ij}$ is respondent $i$'s answer to question $j$. The RHS variables in the regression are defined in the text after equations (1, 2). The numbers of statistically significant coefficients for the variable *LS* are not provided in the table, but can be found as a summary for all regressions in Tables 2, 3, 5-7, 9-11 in Table 12. All significance tests are two-tailed.

"Cons.," "IB," "PE," and "AM" denote "Consulting," "Investment Banking," "Private Equity," and "Asset Management" respectively. "BA," "MA," "PhD," "MBA," and "CFA" denote "Bachelor," "Master," "Doctoral degree," "Master of Business Administration," and "Chartered Financial Analyst" respectively.

| | Replies | % 1-4 | % 3-4 | mean | **Profession** | | | | **Education** | | | | | **Experience** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cons. | IB | PE | AM | BA | MA | PhD | MBA | CFA | $\leq$ 10y | >10y |
| Sample | 272 | | | | 113 | 72 | 58 | 29 | 52 | 37 | 17 | 123 | 36 | 103 | 168 |
| *Panel A: Different models* | | | | | | | | | | | | | | | |
| DCF | 239 | **95%** | **76%** | **3.20** | **3.57**$^a$ | **3.45**$^b$ | 2.06$^a$ | **3.18** | **3.20** | **3.52**$^c$ | **3.18** | **3.02**$^c$ | **3.43** | **3.08** | **3.28** |
| RIM | 228 | 52% | 9% | 0.87 | 0.93 | 0.87 | 0.50$^a$ | 1.36$^b$ | 0.89 | 0.74 | 0.88 | 0.85 | 1.06 | 0.75 | 0.94 |
| EVA | 232 | 69% | 19% | 1.35 | 1.26 | 1.77$^a$ | 0.68$^a$ | 2.00$^b$ | 1.34 | 1.16 | 1.18 | 1.36 | 1.61 | 0.96$^a$ | 1.60$^a$ |
| DDM | 232 | 66% | 18% | 1.31 | 1.37 | 1.48 | 0.66$^a$ | 1.91$^b$ | 1.39 | 1.26 | 1.53 | 1.16$^c$ | 1.71$^c$ | 1.07$^b$ | 1.46$^b$ |
| IRR | 233 | 87% | 47% | 2.25 | 2.31 | 1.51$^a$ | **3.10**$^a$ | 2.27 | 2.64$^b$ | 1.94 | 2.12 | 2.29 | 2.00 | 2.29 | 2.23 |
| *Panel B: Approaches within DCF* | | | | | | | | | | | | | | | |
| NPV | 230 | 91% | 80% | 3.17 | 3.16 | 3.34 | 2.89 | **3.30** | **3.42** | **3.45** | 3.29 | 2.88$^a$ | **3.47** | 3.10 | 3.21 |
| APV | 216 | 56% | 15% | 1.09 | 1.13 | 1.08 | 0.90 | 1.30 | 1.02 | 1.00 | 1.40 | 1.08 | 1.09 | 0.86$^b$ | 1.24$^b$ |
| CCF | 219 | 53% | 14% | 1.00 | 1.03 | 0.94 | 0.88 | 1.26 | 1.05 | 0.87 | 1.19 | 0.98 | 0.97 | 0.99 | 1.00 |
| FtE | 220 | 60% | 23% | 1.29 | 1.38 | 1.21 | 1.15 | 1.40 | 1.43 | 0.87$^c$ | 1.00 | 1.34 | 1.58 | 1.18 | 1.36 |
| WACC | 229 | **94%** | **82%** | **3.25** | **3.44**$^b$ | **3.41** | **2.77**$^b$ | 2.85 | 3.09 | 3.26 | **3.44** | **3.25** | 3.29 | **3.23** | **3.26** |
| *Panel C: What affects choice of DCF approach (in Panel B)* | | | | | | | | | | | | | | | |
| Debt Policy | 216 | **82%** | **48%** | **2.19** | 2.25 | **2.39** | 1.79$^b$ | **2.20** | **2.22** | **2.17** | **2.20** | **2.27** | **2.09** | **2.19** | **2.20** |
| Tax shield risk | 212 | 73% | 15% | 1.32 | 1.38 | 1.33 | 1.05$^c$ | 1.61 | 1.63$^c$ | 1.14 | 1.43 | 1.28 | 1.24 | 1.33 | 1.31 |
| Credit rating | 211 | 74% | 17% | 1.43 | 1.42 | 1.36 | 1.34 | 1.84$^b$ | 1.56 | 1.10 | 1.73 | 1.45 | 1.44 | 1.27 | 1.53 |
| Transaction type | 209 | 79% | 37% | 1.97 | **2.42**$^a$ | 1.26$^a$ | **1.90** | 2.00 | 2.10 | 2.10 | 1.93 | 1.89 | 2.06 | 1.84 | 2.06 |
| Other | 96 | 24% | 13% | 0.66 | 1.30$^a$ | 0.21$^a$ | 0.38 | 1.10 | 0.65 | 0.50 | 1.38 | 0.57 | 0.42 | 0.23$^a$ | 1.02$^a$ |
| *Panel D: Regressions. Significant coefficients. Stat. significant coefficients ($\leq$ 10%) out of 14:* | | | | | | | | | | | | | | | |
| Specification 1 | | | | | 3 | - | 7 | 2 | - | - | - | 1 | - | - | 1 |
| Specification 2 | | | | | 3 | - | 7 | 2 | 2 | 1 | 0 | - | 1 | - | 2 |

Table 7: DCF. Forecasting horizon and terminal value.

This table reports results from the third part of the questionnaire (Multiperiod models). Panels A - C correspond to sets of questions 20 - 21a. Panel A reports the number of "yes" responses ("Counts") to each question within the panel. The general structure in Panels B and C is the same as for Table 2. Three blocks of columns, "Profession," "Education," and "Experience" provide the mean (on the 0 - 4 scale) of the respective responses for the indicated subpopulation (e.g., Consulting, Investment Banking, etc.). Within each panel, the highest number in each column is indicated in bold. Within each panel-block, we check whether the mean of each subpopulation is statistically different from that of the complement population (e.g., Cons. vs. IB, PE, and AM together) and indicate statistical significance at the 1%, 5%, and 10% level by ***a***, ***b***, and ***c***, respectively. Panel D reports the number of statistically significant coefficients at the 10% level or less from running the following regressions for each question in all preceding panels (except "Other"). Panel A represents one question, cash flow forecasting horizon.

Specification 1: $y_{ij} = \beta_{0j} + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} MBA_i + \beta_{5j} HExp_i + \beta_{6j} LS_i + \varepsilon_{ij}$,

Specification 2: $y_{ij} = \beta_0 j + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} BA_i + \beta_{5j} MA_i + \beta_{6j} PhD_i + \beta_{7j} CFA_i + \beta_{8j} HExp_i + \beta_{9j} LS_i + \varepsilon_{ij}$,

where $y_{ij}$ is respondent $i$'s answer to question $j$. The RHS variables in the regression are defined in the text after equations (1, 2). The numbers of statistically significant coefficients for the variable $LS$ are not provided in the table, but can be found as a summary for all regressions in Tables 2, 3, 5-7, 9-11 in Table 12. All significance tests are two-tailed.

"Cons.," "IB," "PE," and "AM" denote "Consulting," "Investment Banking," "Private Equity," and "Asset Management" respectively. "BA," "MA," "PhD," "MBA," and "CFA" denote "Bachelor," "Master," "Doctoral degree," "Master of Business Administration," and "Chartered Financial Analyst" respectively.

| | Replies | % 1-4 | % 3-4 | mean | **Profession** | | | | **Education** | | | | | **Experience** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cons. | IB | PE | AM | BA | MA | PhD | MBA | CFA | $\leq$ 10y | >10y |
| Sample | 272 | | | | 113 | 72 | 58 | 29 | 52 | 37 | 17 | 123 | 36 | 103 | 168 |
| *Panel A: CF forecasting horizon* | | | | | | Count | | | | Count | | | | Count | |
| 5 years | **122** | - | - | - | **61** | 20 | **32** | **9** | **22** | **24** | **6** | **52** | **16** | **47** | **75** |
| 8 years | 28 | - | - | - | 14 | 7 | 5 | 2 | 4 | 1 | 3 | 16 | 4 | 12 | 16 |
| 10 years | 47 | - | - | - | 11 | **26** | 5 | 5 | 12 | 2 | 4 | 19 | 9 | 20 | 27 |
| Other | 25 | - | - | - | 8 | 9 | 4 | 4 | 4 | 1 | 3 | 13 | 4 | 7 | 18 |
| *Panel B: Approach for terminal value* | | | | | | | | | | | | | | | |
| Gordon growth | 217 | **89%** | **78%** | **2.99** | **3.31**$^a$ | **3.54**$^a$ | 1.73$^a$ | **2.50** | **3.07** | **2.86** | **3.43**$^b$ | **2.85** | **3.12** | **2.83** | **3.08** |
| P/B | 194 | 45% | 13% | 0.91 | 0.82 | 0.90 | 0.74 | 1.82$^a$ | 1.11 | 0.83 | 0.82 | 0.76 | 1.25 | 0.68$^b$ | 1.08$^b$ |
| Other mult. | 200 | 72% | 46% | 1.98 | 2.15 | 1.12$^a$ | **2.60**$^a$ | 2.13 | 2.34 | 2.00 | 2.00 | 1.80 | 2.13 | 1.94 | 2.01 |
| Liq.value | 192 | 55% | 9% | 0.91 | 0.84 | 0.80 | 0.92 | 1.50$^b$ | 1.19 | 0.96 | 1.08 | 0.72$^b$ | 0.93 | 0.80 | 0.98 |
| Repl.cost | 192 | 46% | 6% | 0.69 | 0.55$^b$ | 0.92$^c$ | 0.56 | 0.94 | 0.83 | 0.72 | 1.08 | 0.51$^b$ | 0.77 | 0.49$^a$ | 0.82$^a$ |
| Invested cap. | 194 | 46% | 13% | 0.89 | 0.54$^a$ | 1.38$^a$ | 0.80 | 1.35$^c$ | 0.78 | 0.69 | 1.71$^b$ | 0.88 | 0.93 | 0.71$^c$ | 1.02$^c$ |
| Other | 99 | 23% | 16% | 0.71 | 1.00 | 0.33$^b$ | 0.81 | 1.00 | 0.53 | 0.80 | 0.50 | 0.79 | 0.75 | 0.67 | 0.75 |
| *Panel C: Gordon growth: which growth rate* | | | | | | | | | | | | | | | |
| -2% | 127 | 22% | 2% | 0.29 | 0.33 | 0.28 | 0.18 | 0.33 | 0.62$^c$ | 0.13$^c$ | 0.13 | 0.21 | 0.33 | 0.23 | 0.34 |
| -1% | 125 | 30% | 2% | 0.40 | 0.38 | 0.47 | 0.30 | 0.60 | 0.81$^b$ | 0.13$^a$ | 0.25$^b$ | 0.25 | 0.59 | 0.34 | 0.45 |
| 0% | 136 | 65% | 21% | 1.40 | 1.43 | 1.78$^b$ | 0.71$^a$ | 1.57 | 1.87$^b$ | 1.00 | 1.00 | 1.24 | 1.45 | 1.27 | 1.51 |
| 1% | 145 | 77% | 46% | 1.95 | 2.10 | 2.05 | 1.58 | 1.38 | 2.07 | 1.37$^b$ | 2.40 | 2.00 | 1.95 | 1.98 | 1.93 |
| 2% | 162 | **83%** | **56%** | **2.29** | **2.31** | **2.53** | 1.93 | 2.00 | **2.42** | 1.85 | **2.83** | **2.38** | 2.12 | **2.41** | **2.20** |
| 3% | 141 | 61% | 30% | 1.42 | 1.61 | 1.23 | 1.04 | 1.88 | 1.69 | 1.12 | 1.56 | 1.33 | 1.61 | 1.55 | 1.31 |
| 4% | 128 | 30% | 11% | 0.66 | 0.61 | 0.86 | 0.35 | 1.17 | 0.69 | 0.71 | 0.67 | 0.64 | 0.68 | 0.56 | 0.73 |
| Inflation | 157 | 78% | 54% | 2.16 | 2.23 | 1.83$^c$ | **2.36** | 2.42 | 2.03 | 2.00 | 1.78 | 2.27 | 2.29 | 2.17 | 2.15 |
| GDP growth | 161 | 74% | 47% | 1.96 | 1.96 | 1.67 | 2.11 | **2.62**$^b$ | 1.73 | 1.82 | 1.90 | 1.99 | **2.38** | 1.77 | 2.09 |
| Other | 82 | 32% | 18% | 0.93 | 1.44$^b$ | 0.77 | 0.28$^a$ | 1.33 | 0.71 | **2.08**$^b$ | 1.00 | 0.84 | 0.36 | 0.45$^a$ | 1.38$^a$ |
| *Panel D: Regressions. Significant coefficients. Stat. significant coefficients ($\leq$ 10%) out of 16:* | | | | | | | | | | | | | | | |
| Specification 1 | | | | | 3 | - | 4 | 5 | - | - | - | 1 | - | - | 0 |
| Specification 2 | | | | | 2 | - | 5 | 4 | 4 | 1 | 0 | - | 0 | - | 0 |

Table 8: Terminal value. Example.

This table shows values (in %) of the expression

$$\frac{PV(Growing\ perpetuity\ starting\ in\ T\ years)}{PV(Growing\ T\text{-}year\ annuity)+PV(Growing\ perpetuity\ starting\ in\ T\ years)}$$

i.e. terminal value as a percent of total value under the most standard implementation of the DCF technique (which uses the Gordon growth model) to calculate terminal values. The numbers in bold represent the values for the most commonly used scenario, namely a 5 year forecasting horizon and a 2% terminal value growth rate.

| | | | Forecasting horizon | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 5 years | | | 8 years | | | 10 years | | |
| | | | Forecasting period growth rate | | | | | | | | |
| | | | 2% | 4% | 6% | 2% | 4% | 6% | 2% | 4% | 6% |
| WACC | 8% | Term. value growth rate 0% | 69% | 70% | 71% | 56% | 58% | 59% | 49% | 51% | 53% |
| | | 2% | **75%** | **76%** | **77%** | 63% | 65% | 67% | 56% | 59% | 61% |
| | | 4% | 82% | 83% | 83% | 73% | 74% | 75% | 66% | 69% | 70% |
| | 10% | 0% | 63% | 64% | 65% | 49% | 50% | 52% | 41% | 43% | 46% |
| | | 2% | **69%** | **69%** | **70%** | 55% | 57% | 58% | 47% | 49% | 52% |
| | | 4% | 75% | 76% | 76% | 62% | 64% | 65% | 55% | 57% | 59% |

Table 9: DCF. Cost of capital.

This table reports results from the third part of the questionnaire (Multiperiod models). The general structure is the same as for Table 2. Panels A - C correspond to sets of questions 26 - 27a, Panel D corresponds to question 29a. Three blocks of columns, "Profession," "Education," and "Experience" provide the mean (on the 0 - 4 scale) of the respective responses for the indicated subpopulation (e.g., Consulting, Investment Banking, etc.). Within each panel, the highest number in each column is indicated in bold. Within each panel-block, we check whether the mean of each subpopulation is statistically different from that of the complement population (e.g., Cons. vs. IB, PE, and AM together) and indicate statistical significance at the 1%, 5%, and 10% level by ***a***, ***b***, and ***c***, respectively. Panel E reports the number of statistically significant coefficients at the 10% level or less from running the following regressions for each question in all preceding panels (except "Other")

Specification 1: $y_{ij} = \beta_{0j} + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} MBA_i + \beta_{5j} HExp_i + \beta_{6j} LS_i + \varepsilon_{ij}$,

Specification 2: $y_{ij} = \beta_0 j + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} BA_i + \beta_{5j} MA_i + \beta_{6j} PhD_i + \beta_{7j} CFA_i + \beta_{8j} HExp_i + \beta_{9j} LS_i + \varepsilon_{ij}$,

where $y_{ij}$ is respondent $i$'s answer to question $j$. The RHS variables in the regression are defined in the text after equations (1, 2). The numbers of statistically significant coefficients for the variable $LS$ are not provided in the table, but can be found as a summary for all regressions in Tables 2, 3, 5-7, 9-11 in Table 12. All significance tests are two-tailed.

"Cons.," "IB," "PE," and "AM" denote "Consulting," "Investment Banking," "Private Equity," and "Asset Managerment" respectively. "BA," "MA," "PhD," "MBA," and "CFA" denote "Bachelor," "Master," "Doctoral degree," "Master of Business Administration," and "Chartered Financial Analyst" respectively.

| | Replies | % 1-4 | % 3-4 | mean | **Profession** | | | | **Education** | | | | | **Experience** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cons. | IB | PE | AM | BA | MA | PhD | MBA | CFA | $\leq$ 10y | >10y |
| Sample | 272 | | | | 113 | 72 | 58 | 29 | 52 | 37 | 17 | 123 | 36 | 103 | 168 |
| *Panel A: Calculating cost of debt* | | | | | | | | | | | | | | | |
| Yield | 150 | 73% | 38% | 1.77 | 1.76 | 1.57 | 1.73 | **2.64**$^b$ | 1.59 | 1.77 | 1.29 | 1.71 | 2.19 | 1.42$^b$ | 2.02$^b$ |
| Coupon | 151 | 68% | 32% | 1.61 | 1.52 | 1.63 | 1.66 | 2.00 | 2.04 | 1.29 | 2.00 | 1.66 | 1.16$^b$ | 1.73 | 1.52 |
| Rf rate | 146 | 57% | 25% | 1.34 | 1.32 | 1.34 | 1.09 | 2.44$^b$ | 1.89$^b$ | 0.80$^b$ | 2.29 | 1.39 | 0.73$^a$ | 1.49 | 1.23 |
| Rf+spread | 172 | **89%** | **72%** | **2.77** | **2.83** | **2.78** | **2.57** | 3.00 | **2.77** | **2.68** | 2.00 | **2.79** | **2.93** | **2.70** | **2.82** |
| CAPM | 150 | 69% | 41% | 1.80 | 1.99 | 1.79 | 1.28$^b$ | 2.33 | 2.19 | 1.33 | **3.00**$^b$ | 1.51$^b$ | 2.17 | 1.65 | 1.92 |
| Other | 60 | 17% | 7% | 0.37 | 0.83$^c$ | 0.21 | 0.16 | 0.00$^a$ | 0.73 | 0.60 | 0.00$^a$ | 0.34 | 0.00$^a$ | 0.41 | 0.32 |
| *Panel B: Calculating cost of equity* | | | | | | | | | | | | | | | |
| CAPM | 193 | **87%** | **76%** | **2.98** | **3.46**$^a$ | **3.09** | **2.13**$^a$ | **2.07**$^b$ | **2.86** | **3.00** | **3.57**$^a$ | **2.85** | **3.25** | **3.05** | **2.93** |
| Fama-French | 162 | 24% | 4% | 0.36 | 0.43 | 0.40 | 0.19$^b$ | 0.33 | 0.32 | 0.26 | 0.67 | 0.40 | 0.33 | 0.49$^c$ | 0.27$^c$ |
| Other multif. mod. | 161 | 29% | 8% | 0.55 | 0.48 | 0.61 | 0.58 | 0.58 | 0.43 | 0.83 | 0.50 | 0.56 | 0.46 | 0.48 | 0.59 |
| Other | 84 | 24% | 11% | 0.58 | 0.64 | 0.48 | 0.52 | 1.00 | 0.82 | 0.00$^a$ | 0.33 | 0.33$^c$ | 1.42$^c$ | 0.41 | 0.72 |
| *Panel C: Cost of equity: risk-free rate* | | | | | | | | | | | | | | | |
| 3m T-bill | 136 | 35% | 16% | 0.80 | 0.69 | 0.92 | 0.70 | 1.33 | 0.52 | 0.91 | 1.33 | 0.88 | 0.67 | 1.02$^c$ | 0.64$^c$ |
| LIBOR | 138 | 44% | 25% | 1.08 | 1.05 | 0.95 | 1.35 | 0.88 | 1.20 | 1.05 | 1.38 | 1.15 | 0.62$^c$ | 1.18 | 1.00 |
| Swap rate | 128 | 34% | 15% | 0.79 | 0.68 | 0.46$^b$ | 0.96 | **2.71**$^b$ | 0.74 | 0.22$^a$ | 0.13$^a$ | 0.91 | 1.32$^c$ | 0.91 | 0.70 |
| Longer term T-sec. | 163 | **85%** | **70%** | **2.74** | **2.70** | **3.31**$^a$ | **1.93**$^a$ | 2.64 | **2.70** | **2.82** | **3.27**$^b$ | **2.51** | **3.07** | **2.59** | **2.84** |
| CFmatch | 137 | 48% | 28% | 1.33 | 1.55 | 1.22 | 1.04 | 1.00 | 1.04 | 1.15 | 1.44 | 1.44 | 1.52 | 1.15 | 1.45 |
| Other | 73 | 22% | 16% | 0.73 | 1.35$^c$ | 0.68 | 0.35 | 0.00$^a$ | 0.17$^b$ | 2.00 | 0.00$^a$ | 0.83 | 0.33 | 0.50 | 0.95 |
| *Panel D: Cost of equity: market risk premium (in%)* | | | | | | | | | | | | | | | |
| | 120 | - | - | 5.41 | 5.52 | 5.28 | 5.69 | 4.58$^a$ | 5.31 | 5.69 | 5.72 | 5.50 | 5.10$^c$ | 5.69$^c$ | 5.22$^c$ |
| *Panel E: Regressions. Significant coefficients. Stat. significant coefficients ($\leq$ 10%) out of 14:* | | | | | | | | | | | | | | | |
| Specification 1 | | | | | 1 | - | 2 | 3 | - | - | - | 0 | - | - | 2 |
| Specification 2 | | | | | 1 | - | 2 | 3 | 0 | 0 | 2 | - | 2 | - | 3 |

Table 10: WACC. Implementation and confusion.

This table reports results from the third part of the questionnaire (Multiperiod models). Panels A - C correspond to sets of questions 22a - 23. Panels A and B report the number of responses ("Counts") to each question within the panel. The general structure in Panel C is the same as for Table 2. Three blocks of columns, "Profession," "Education," and "Experience" provide the mean (on the 0 - 4 scale) of the respective responses for the indicated subpopulation (e.g., Consulting, Investment Banking, etc.). Within Panel C, the highest number in each column is indicated in bold. In Panels A and B questions in bold indicate the wrong answer. Within each panel-block in Panel C, we check whether the mean of each subpopulation is statistically different from that of the complement population (e.g., Cons. vs. IB, PE, and AM together) and indicate statistical significance at the 1%, 5%, and 10% level by ***a***, ***b***, and ***c***, respectively. Panel D reports the number of statistically significant coefficients at the 10% level or less from running the following regressions for each question in all preceding panels (except "Other")

Specification 1: $y_{ij} = \beta_{0j} + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} MBA_i + \beta_{5j} HExp_i + \beta_{6j} LS_i + \varepsilon_{ij}$,

Specification 2: $y_{ij} = \beta_{0}j + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} BA_i + \beta_{5j} MA_i + \beta_{6j} PhD_i + \beta_{7j} CFA_i + \beta_{8j} HExp_i + \beta_{9j} LS_i + \varepsilon_{ij}$,

where $y_{ij}$ is respondent $i$'s answer to question $j$. The RHS variables in the regression are defined in the text after equations (1, 2). The numbers of statistically significant coefficients for the variable *LS* are not provided in the table, but can be found as a summary for all regressions in Tables 2, 3, 5-7, 9-11 in Table 12. All significance tests are two-tailed.

"Cons.," "IB," "PE," and "AM" denote "Consulting," "Investment Banking," "Private Equity," and "Asset Managerment" respectively. "BA," "MA," "PhD," "MBA," and "CFA" denote "Bachelor," "Master," "Doctoral degree," "Master of Business Administration," and "Chartered Financial Analyst" respectively.

| | Replies | % 1-4 | % 3-4 | mean | **Profession** | | | | **Education** | | | | | **Experience** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cons. | IB | PE | AM | BA | MA | PhD | MBA | CFA | $\leq$ 10y | >10y |
| Full sample | 272 | | | | 113 | 72 | 58 | 29 | 52 | 37 | 17 | 123 | 36 | 103 | 168 |
| *Panel A: WACC: weights for comparables* | | | | | | Count | | | | Count | | | | Count | |
| MarketW | 141 | - | - | - | 67 | 36 | 23 | 15 | 26 | 17 | 7 | 64 | 25 | 59 | 82 |
| **TargetW** | 57 | - | - | - | 21 | 22 | 9 | 5 | 11 | 8 | 6 | 23 | 8 | 17 | 40 |
| Other | 3 | - | - | - | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| *Panel B: WACC: weights for valued firm* | | | | | | Count | | | | Count | | | | Count | |
| **MarketW** | 92 | - | - | - | 34 | 28 | 16 | 14 | 15 | 16 | 5 | 40 | 15 | 33 | 59 |
| TargetW | 99 | - | - | - | 50 | 29 | 16 | 4 | 20 | 10 | 8 | 44 | 16 | 39 | 60 |
| Other | 6 | - | - | - | 3 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 3 | 3 |
| *Panel C: Future changes in capital structure* | | | | | | | | | | | | | | | |
| WACC | 189 | **60%** | **31%** | **1.47** | **1.36** | **1.96**$^a$ | **0.97**$^b$ | 1.21 | **1.44** | **1.23** | **2.17** | **1.54** | **1.23** | **1.61** | **1.37** |
| FtE | 167 | 48% | 15% | 0.95 | 1.09 | 0.92 | 0.63$^c$ | 1.00 | 0.70 | 0.96 | 0.71 | 1.03 | 1.19 | 0.90 | 0.98 |
| APV | 160 | 44% | 16% | 0.94 | 1.18$^b$ | 0.63$^b$ | 0.63$^c$ | **1.38** | 0.70 | 0.78 | 1.13 | 1.13 | 0.84 | 0.78 | 1.04 |
| Other | 72 | 24% | 15% | 0.74 | 1.23$^c$ | 0.26$^b$ | 0.30$^c$ | 2.00 | 0.36 | 0.60 | 0.80 | 0.71 | 1.33 | 0.56 | 0.88 |
| *Panel D: Regressions. Significant coefficients. Stat. significant coefficients ($\leq$ 10%) out of 7:* | | | | | | | | | | | | | | | |
| Specification 1 | | | | | 3 | - | 2 | 1 | - | - | - | 1 | - | - | 0 |
| Specification 2 | | | | | 2 | - | 1 | 1 | 0 | 0 | 0 | - | 0 | - | 0 |

Table 11: Present value of tax shield (PVTS).

This table reports results from the third part of the questionnaire (Multiperiod models). The general structure is the same as for Table 2. Panels A, B correspond to sets of questions 24, 25. Three blocks of columns, "Profession," "Education," and "Experience" provide the mean (on the 0 - 4 scale) of the respective responses for the indicated subpopulation (e.g., Consultants, Investment Bankers, etc.). Within each panel, the highest number in each column is indicated in bold. Within each panel-block, we check whether the mean of each subpopulation is statistically different from that of the complement population (e.g., Cons. vs. IB, PE, and AM together) and indicate statistical significance at the 1%, 5%, and 10% level by ***a***, ***b***, and ***c***, respectively. Panel C reports the number of statistically significant coefficients at the 10% level or less from running the following regressions for each question in all preceding panels (except "Other")

Specification 1: $y_{ij} = \beta_{0j} + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} MBA_i + \beta_{5j} HExp_i + \beta_{6j} LS_i + \varepsilon_{ij}$,

Specification 2: $y_{ij} = \beta_0 j + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} BA_i + \beta_{5j} MA_i + \beta_{6j} PhD_i + \beta_{7j} CFA_i + \beta_{8j} HExp_i + \beta_{9j} LS_i + \varepsilon_{ij}$,

where $y_{ij}$ is respondent $i$'s answer to question $j$. The RHS variables in the regression are defined in the text after equations (1, 2). The numbers of statistically significant coefficients for the variable *LS* are not provided in the table, but can be found as a summary for all regressions in Tables 2, 3, 5-7, 9-11 in Table 12. All significance tests are two-tailed.

"Cons.," "IB," "PE," and "AM" denote "Consulting," "Investment Banking," "Private Equity," and "Asset Managerment" respectively. "BA," "MA," "PhD," "MBA," and "CFA" denote "Bachelor," "Master," "Doctoral degree," "Master of Business Administration," and "Chartered Financial Analyst" respectively. $R_u$ denotes "unlevered cost of equity," $R_d$ denotes "cost of debt." R(DebtPol) and R(CF) mean "it depends on debt policy of the firm" and "it depends on how stable the forecasted cash flows are," respectively.

| | Replies | % 1-4 | % 3-4 | mean | **Profession** | | | | **Education** | | | | | **Experience** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cons. | IB | PE | AM | BA | MA | PhD | MBA | CFA | $\leq$ 10y | >10y |
| Sample | 272 | | | | 113 | 72 | 58 | 29 | 52 | 37 | 17 | 123 | 36 | 103 | 168 |
| *Panel A: APV: PVTS calculation. Discount at:* | | | | | | | | | | | | | | | |
| $R_u$ | 128 | **48%** | **25%** | **1.18** | **1.46**$^c$ | **1.05** | 0.58$^a$ | **1.86** | **0.96** | 0.81 | 0.75 | **1.50**$^b$ | 1.24 | **1.12** | **1.23** |
| $R_d$ | 130 | 43% | 14% | 0.95 | 1.14 | 0.87 | 0.46$^a$ | 1.30 | 0.68 | **1.14** | **1.67** | 0.85 | 0.95 | 0.80 | 1.05 |
| R(DebtPol) | 127 | 42% | 14% | 0.93 | 1.24$^b$ | 0.68 | 0.44$^b$ | 1.40 | 0.79 | 0.71 | 1.13 | 0.91 | **1.44** | 1.06 | 0.84 |
| R(CF) | 128 | 45% | 17% | 1.04 | 1.34$^b$ | 0.78 | **0.68**$^c$ | 1.20 | 0.87 | 1.00 | **1.67** | 0.98 | 1.26 | 0.96 | 1.09 |
| Other | 68 | 21% | 7% | 0.49 | 0.95$^c$ | 0.23 | 0.37 | 0.33 | 0.79 | 0.50 | 0.17 | 0.53 | 0.00$^a$ | 0.47 | 0.50 |
| *Panel B: Do you consider personal taxes in PVTS?* | | | | | | | | | | | | | | | |
| Yes | 189 | 25% | 5% | 0.42 | 0.48 | 0.21$^b$ | 0.64 | 0.31 | 0.41 | 0.76$^c$ | 0.33 | 0.42 | 0.21 | 0.46 | 0.40 |
| *Panel C: Regressions. Significant coefficients. Stat. significant coefficients ($\leq$ 10%) out of 5:* | | | | | | | | | | | | | | | |
| Specification 1 | | | | | 2 | - | 1 | 0 | - | - | - | 1 | - | - | 0 |
| Specification 2 | | | | | 2 | - | 1 | 0 | 0 | 0 | 1 | - | 0 | - | 0 |

Table 12: Within-profession regressions. Significant coefficients.

Panel A sums up all statistically significant coefficients (10% or less) across all 98 questions in all tables (2, 3, 5-7, 9-11). Panel B reports the number of times, across all tables, the means test gives a statistically significant result (10% or less). All significance tests are two-tailed.

Specification 1: $y_{ij} = \beta_{0j} + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} MBA_i + \beta_{5j} HExp_i + \beta_{6j} LS_i + \varepsilon_{ij}$,

Specification 2: $y_{ij} = \beta_0 j + \beta_{1j} Cons_i + \beta_{2j} PE_i + \beta_{3j} AM_i + \beta_{4j} BA_i + \beta_{5j} MA_i + \beta_{6j} PhD_i + \beta_{7j} CFA_i + \beta_{8j} HExp_i + \beta_{9j} LS_i + \varepsilon_{ij}$,

where $y_{ij}$ is respondent $i$'s answer to question $j$. The RHS variables in the regression are defined in the text after equations (1, 2). "Cons.," "IB," "PE," and "AM" denote "Consulting," "Investment Banking," "Private Equity," and "Asset Managerment" respectively. "BA," "MA," "PhD," "MBA," and "CFA" denote "Bachelor," "Master," "Doctoral degree," "Master of Business Administration," and "Chartered Financial Analyst" respectively.

| | | **Profession** | | | | **Education** | | | | | **Experience** | | **Large Size** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Cons. | IB | PE | AM | BA | MA | PhD | MBA | CFA | $\leq$ 10y | >10y | >5bn |
| Sample | 272 | 113 | 72 | 58 | 29 | 52 | 37 | 17 | 123 | 36 | 103 | 168 | 68 |
| *Panel A: Regressions. Significant coefficients* | | | | | | | | | | | | | |
| Across all tables, out of 98: | | | | | | | | | | | | | |
| Specification 1 | | 23 | - | 34 | 22 | - | - | - | 8 | - | - | 5 | 6 |
| Specification 2 | | 25 | - | 33 | 22 | 10 | 5 | 6 | - | 5 | - | 6 | 4 |
| *Panel B: Means test. Significant occurrences* | | | | | | | | | | | | | |
| | | 123 out of 372 | | | | 54 out of 465 | | | | | 20 out of 93 | | 19 out of 93 |

Table 13: Purpose of valuation across professions.

This table reports results from the first part of the questionnaire (Preliminary and personal questions). The general structure is the same as for Table 2. Panels A - C correspond to sets of questions 1 - 3. The block of columns "Profession" provides the mean (on the 0 - 4 scale) of the respective responses for the indicated subpopulation (e.g., Consultants, Investment Bankers, etc.). Within each panel, the highest number in each column is indicated in bold. Within each "Profession" panel-block, we check whether the mean of each subpopulation is statistically different from that of the complement population (e.g., Cons. vs. IB, PE, and AM together) and indicate statistical significance at the 1%, 5%, and 10% level by ***a***, ***b***, and ***c***, respectively. All significance tests are two-tailed.
"Cons.," "IB," "PE," and "AM" denote "Consulting," "Investment Banking," "Private Equity," and "Asset Management" respectively.

| | Replies | % 1-4 | % 3-4 | mean | **Profession** | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Cons. | IB | PE | AM |
| Full sample | 272 | | | | 113 | 72 | 58 | 29 |
| *Panel A: Type of investment* | | | | | | | | |
| Project finance | 211 | 46% | 9% | 0.79 | $1.17^{a}$ | 0.63 | $0.33^{a}$ | 0.50 |
| Listed firms | 256 | 88% | 61% | 2.66 | $2.23^{a}$ | $\mathbf{3.96^{a}}$ | $1.38^{a}$ | $\mathbf{3.31^{b}}$ |
| Unlisted firms | 246 | **92%** | **68%** | **2.83** | $\mathbf{3.38^{a}}$ | $1.47^{a}$ | $\mathbf{3.67^{a}}$ | $1.52^{a}$ |
| Real estate | 213 | 39% | 10% | 0.72 | $1.03^{a}$ | $0.35^{a}$ | 0.59 | 0.57 |
| Other | 173 | 37% | 11% | 0.77 | $1.19^{a}$ | $0.30^{a}$ | 0.56 | 0.77 |
| *Panel B: Type of transaction* | | | | | | | | |
| Merger or acquisition | 229 | 85% | 56% | 2.44 | $\mathbf{3.27^{a}}$ | $1.29^{a}$ | 2.33 | $0.95^{a}$ |
| Investment decisions | 255 | **95%** | **77%** | **3.12** | $2.30^{a}$ | $\mathbf{3.85^{a}}$ | $\mathbf{3.43^{b}}$ | $\mathbf{3.62^{a}}$ |
| Going public | 212 | 69% | 19% | 1.33 | $1.12^{b}$ | $1.83^{a}$ | $1.02^{c}$ | 1.24 |
| Going private | 204 | 61% | 24% | 1.26 | $1.56^{a}$ | $0.65^{a}$ | 1.51 | $0.75^{b}$ |
| Other | 134 | 31% | 21% | 0.85 | $1.50^{a}$ | $0.03^{a}$ | 0.88 | 0.75 |
| *Panel C: Role* | | | | | | | | |
| Buy-side | 222 | 81% | 48% | 2.22 | $1.93^{a}$ | $0.39^{a}$ | $\mathbf{3.33^{a}}$ | $\mathbf{3.71^{a}}$ |
| Sell-side | 242 | **83%** | **58%** | **2.52** | $2.30^{b}$ | $\mathbf{3.99^{a}}$ | $1.72^{a}$ | $0.57^{a}$ |
| Advisory role | 208 | 72% | 45% | 2.10 | $\mathbf{3.09^{a}}$ | $1.21^{a}$ | $0.54^{a}$ | 1.57 |
| Other | 105 | 11% | 6% | 0.29 | $0.86^{a}$ | $0.06^{b}$ | 0.13 | $0.00^{a}$ |

Table 14: Within profession characteristics.

This table reports results from the first part of the questionnaire (Preliminary and personal questions). Panels A - C correspond to sets of questions 1 - 3. Three blocks of columns provide the means (on the 0 - 4 scale) of the respective responses for two clusters within the three indicated subpopulations: Consulting, Investment Banking, Private Equity. For each profession, the two clusters are created by running a cluster analysis on the respective sample of respondents, using the same procedure as in Figure 2. Within each panel, the highest number in each column is indicated in bold. Within each profession for each question we check whether the means of the two clusters are significantly different from each other and indicate statistical significance at the 1%, 5%, and 10% level by ***a***, ***b***, and ***c***, respectively. All significance tests are two-tailed. Squares around numbers in the Clus1 columns are used to indicate numbers that are high relative to the corresponding Clus2 numbers.

| | **Consulting** | | | **Inv. Banking** | | | **Private Equity** | | |
|---|---|---|---|---|---|---|---|---|---|
| **Questions** | Clus1 | Clus2 | t-stat | Clus1 | Clus2 | t-stat | Clus1 | Clus2 | t-stat |
| *Panel A: Type of investment* | | | | | | | | | |
| Project finance | 1.37 | 1.05 | (1.33) | 1.20 | 0.14 | (4.30)$^{a}$ | 0.40 | 0.21 | (0.93) |
| Listed firms | 3.17 | 1.48 | (8.71)$^{a}$ | **4.00** | **3.93** | (1.44) | 1.81 | 0.61 | (3.86)$^{a}$ |
| Unlisted firms | **3.51** | **3.36** | (0.98) | 1.95 | 1.00 | (4.01)$^{a}$ | **3.74** | **3.58** | (0.75) |
| Real estate | 1.45 | 0.78 | (2.46)$^{b}$ | 0.58 | 0.04 | (3.02)$^{a}$ | 0.65 | 0.32 | (1.28) |
| *Panel B: Type of transaction* | | | | | | | | | |
| Merger or acquisition | **3.44** | **3.18** | (1.90)$^{c}$ | 2.00 | 0.71 | (5.78)$^{a}$ | 3.41 | 0.72 | (11.17)$^{a}$ |
| Investment decisions | 2.81 | 1.97 | (3.61)$^{a}$ | **3.81** | **3.79** | (0.11) | **3.56** | **3.16** | (1.08) |
| Going public | 1.74 | 0.67 | (4.07)$^{a}$ | 2.55 | 1.31 | (4.53)$^{a}$ | 1.33 | 0.59 | (2.26)$^{b}$ |
| Going private | 2.00 | 1.13 | (3.45)$^{a}$ | 1.29 | 0.14 | (4.17)$^{a}$ | 2.19 | 0.47 | (5.07)$^{a}$ |
| *Panel C: Role* | | | | | | | | | |
| Buy-side | 2.47 | 1.55 | (4.33)$^{a}$ | 0.75 | 0.16 | (1.72) | **3.30** | **3.28** | (0.05) |
| Sell-side | 2.89 | 1.92 | (4.67)$^{a}$ | **3.95** | **4.00** | (-1.00) | 2.26 | 0.83 | (3.88)$^{a}$ |
| Advisory role | **3.36** | **2.87** | (2.56)$^{a}$ | 2.12 | 0.42 | (4.84)$^{a}$ | 0.67 | 0.24 | (1.38) |
| Number of people | 41 | 62 | | 21 | 29 | | 27 | 19 | |

Table 15: Within profession regressions.

This table reports the results from running the following regression for all 98 questions from tables 2, 3, 5-7, 9-11 within each profession: $y_{ij} = \beta_{0j} + \beta_{1j} Clus1_i + \beta_{2j} MBA_i + \beta_{3j} HExp_i + \beta_{4j} LS_i + \varepsilon_{ij}$,
where $y_i$ is respondent $i$'s answer to question $j$. The RHS variables in the regression are defined in the text after equation (9). The table provides the number of statistically significant coefficients (10% or less) for each variable within each profession, summed over all questions. The row labelled "Total" provides the number of statistically significant coefficients across all questions.
"Clus1," "MBA," "HExp," and "LS" denote "Cluster1," "Master of Business Administration," "High Experience," and "Large Size" respectively.

| | **N of** | **Consultants** | | | | **Investment Bankers** | | | | **Private Equity** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Questions** | Clus1 | MBA | HExp | LS | Clus1 | MBA | HExp | LS | Clus1 | MBA | HExp | LS |
| Choice of valuation approach (Tab.2) | 13 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 5 | 0 | 0 |
| Multiples (Tab.3) | 20 | 2 | 5 | 0 | 1 | 4 | 1 | 0 | 1 | 3 | 0 | 2 | 1 |
| Multiples. Comparables selection (Tab.5) | 9 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 1 |
| Multi-period models (Tab.6) | 14 | 2 | 4 | 3 | 1 | 5 | 2 | 3 | 0 | 1 | 0 | 3 | 0 |
| DCF. Forecast. horizon and term. val. (Tab.7) | 16 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 3 | 1 |
| DCF. Cost of Capital (Tab.9) | 14 | 3 | 0 | 2 | 0 | 1 | 0 | 2 | 1 | 1 | 1 | 0 | 0 |
| WACC. Implem. and confusion (Tab.10) | 7 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| PVTS Calculation (Tab.11) | 5 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| Total | 98 | 10 | 13 | 7 | 3 | 16 | 3 | 6 | 4 | 9 | 12 | 11 | 3 |

Table 16: Regressions with valuation purpose controls. Significant coefficients.

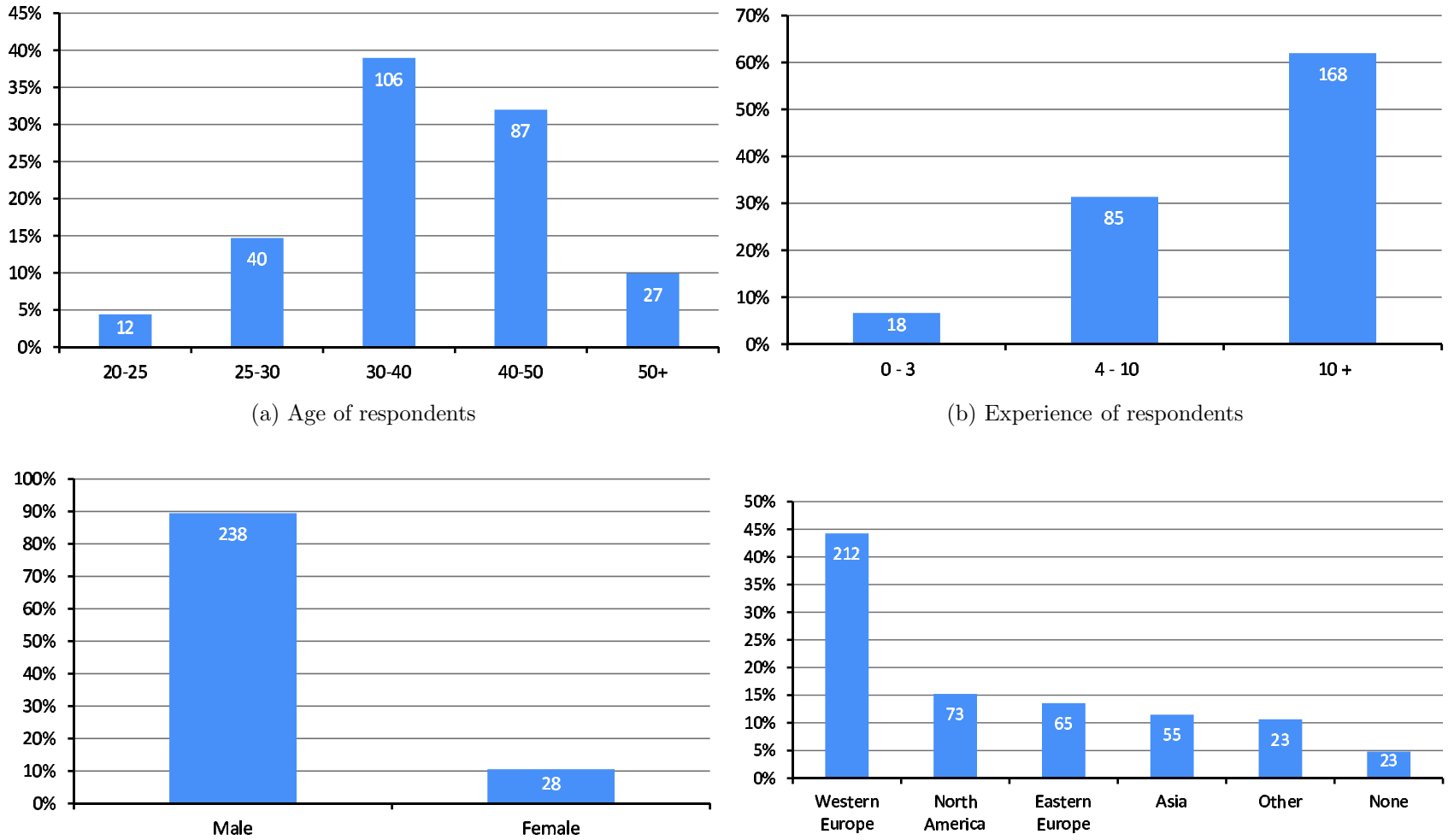
The table sums up all statistically significant coefficients (10% or less) across all 98 questions in all tables (2, 3, 5-7, 9-11). All significance tests are two-tailed.

Specification 1: $y_{ij} = \beta_{0j} + \beta_{1j} Cons_i + \beta_{2j} IB_i + \beta_{3j} PE_i + \beta_{4j} MBA_i + \beta_{5j} HExp_i + \beta_{6j} LS_i + \beta_{7j} Clus2_i + \varepsilon_i$,

Specification 2: $y_{ij} = \beta_{0j} + \beta_{1j} Cons_i + \beta_{2j} IB_i + \beta_{3j} PE_i + \beta_{4j} BA_i + \beta_{5j} MA_i + \beta_{6j} PhD_i + \beta_{7j} CFA_i + \beta_{8j} HExp_i + \beta_{9j} LS_i + \beta_{10j} Clus2_i + \varepsilon_{ij}$,

where $y_{ij}$ is respondent $i$'s answer to question $j$. The RHS variables in the regression are defined in the text.
"Cons.," "IB," "PE," and "AM" denote "Consulting," "Investment Banking," "Private Equity," and "Asset Management" respectively. "BA," "MA," "PhD," "MBA," and "CFA" denote "Bachelor," "Master," "Doctoral degree," "Master of Business Administration," and "Chartered Financial Analyst" respectively. "Cluster 2" consists of specialists for each profession.

| | **Profession and valuation purpose clusters** | | | | | | | **Education** | | | | | **Experience** | | **Large Size** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Consult. | | IB | | PE | | | | | | | | | |
| | Cons. | Cluster 2 | IB | Cluster 2 | PE | Cluster 2 | AM | BA | MA | PhD | MBA | CFA | $\leq$ 10y | >10y | >5bn |
| Specification 1 | 18 | 10 | 21 | - | 26 | - | - | - | - | - | 7 | - | - | 5 | 4 |
| | 21 | - | 15 | 5 | 26 | - | - | - | - | - | 6 | - | - | 6 | 5 |
| | 21 | - | 23 | - | 22 | 6 | - | - | - | - | 7 | - | - | 5 | 4 |
| Specification 2 | 19 | 8 | 22 | - | 22 | - | - | 10 | 4 | 6 | - | 6 | - | 6 | 3 |
| | 20 | - | 13 | 5 | 21 | - | - | 10 | 3 | 5 | - | 6 | - | 7 | 4 |
| | 120 | - | 23 | - | 20 | 5 | - | 9 | 4 | 6 | - | 6 | - | 5 | 3 |




(a) Age of respondents

(b) Experience of respondents

(c) Gender of respondents

(d) Respondents' regional focus

Figure 1: Some survey respondent characteristics of valuation professionals (based on the full sample of 272).

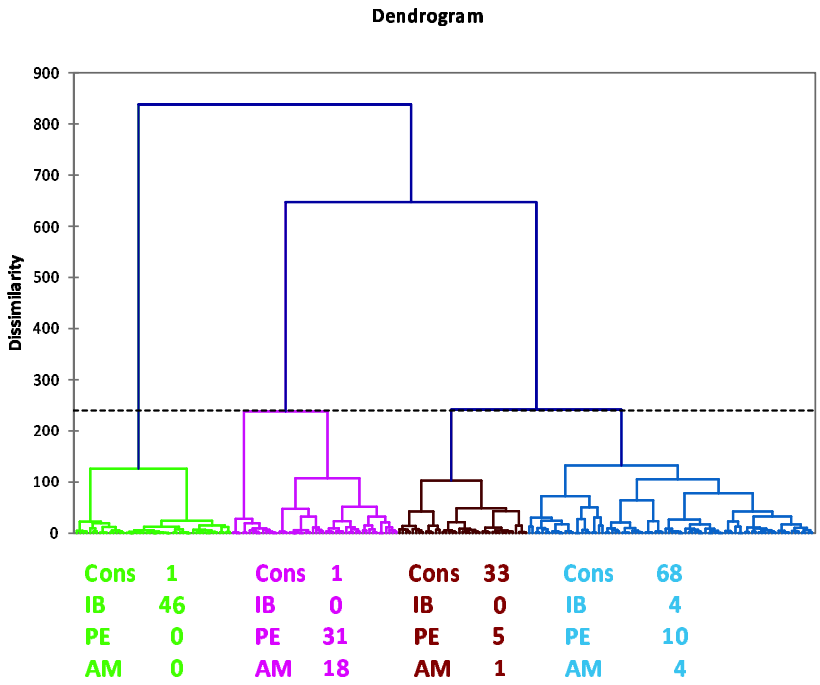



Figure 2: Clusters by valuation purpose.

Dendrogram produced by cluster analysis (hierarchical, agglomerative, Ward's linkage, nearest-neighbor for missing values) set to give four clusters. Distances are calculated using the Euclidean metric based on eleven characteristics (Project Finance, Listed, Unlisted, Real Estate; M&A, Investment Decisions, Going Public, Going Private; Buy side, Sell side, Advisory), on a scale from 0 to 4, for each of the 222 respondents in the sample. The numbers below the dendrogram provide the number of people, by profession, in each of the four clusters. Dissimilarity is the increase in the sum of squared distances from the mean cluster vectors from joining two clusters, as given by equation 8 in the text."Cons.," "IB," "PE," and "AM" denote "Consulting," "Investment Banking," "Private Equity," and "Asset Management" respectively.