

# SETTING THE STANDARD FOR PASSING PROFESSIONAL CERTIFICATION EXAMINATIONS

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## **SETTING THE STANDARD FOR PASSING PROFESSIONAL CERTIFICATION EXAMINATIONS**

Professional certification programs are valuable for employers, employees, and prospective employees (students), and the recent proliferation of finance certification programs is testament to that perceived value in the finance discipline. Yet the validity of such certifications depends largely on how the administering organizations define and assess minimum competence. This paper discusses standard setting for professional certification examinations, focusing on three of the most visible finance certifications—the CFA<sup>®</sup>, CFM, and CMA Programs.

### **INTRODUCTION**

Voluntary professional certification programs provide external competency validation, giving employers a mechanism to identify individuals who have met certain predetermined standards and employees and prospective employees (students) a means to distinguish themselves in the job market. The recent proliferation of finance certification programs is well documented in Smith and Mansinghka [1999]. From the 1920s through the 1960s, only eight programs emerged, followed by seven more during the 1970s and 1980s, and an additional five during the 1990s. Certification programs now exist for nearly every finance sub-discipline, and finance is certainly not unique in the proliferation of certification programs, as nearly every professional discipline is experiencing the same phenomenon. Neither is the popularity of certification programs limited to the United States. As discussed by Thomas [1996], the shrinking globe calls for greater transportability of skill sets, as well as commonly accepted standards across national borders.

Three of the most visible certification programs in finance are the Chartered Financial Analyst<sup>®</sup> (CFA), Certified in Financial Management (CFM), and Certified Management Accountant (CMA) Programs. The Association for Investment Management and Research

(AIMR<sup>®</sup>) administers the CFA Program, and participation in this program has grown rapidly in recent years. In 1990, nearly 8,800 candidates sat for one of the three levels of the CFA examination. In 2002, approximately 101,300 candidates from 151 countries are scheduled to sit for one of the three levels of the examination. The CFA Level I examination is entirely multiple choice in format, and the Level II and III exams are in item set, essay, and problem formats. The Institute of Certified Management Accountants (ICMA) administers the CFM and CMA Programs. The CFM and CMA exams are computer-based and entirely multiple choice in format. Since the ICMA introduced computer-based testing in 1997, over 40,000 examinations have been given and candidates from over 50 countries have participated.

One of the questions most frequently asked by candidates for all three designations, and in the authors' experience by students in an academic setting as well, is how the minimum passing score is established. Many candidates, and students, apparently believe that performance standards are established in an ad hoc, subjective, or informal way; that belief may be justified in some instances, but most are surprised to find that formal standard setting methods exist and are used effectively.

This paper focuses on the methods used by the CFA, CFM, and CMA Programs to determine the minimum level of competence necessary to pass the CFA Level I, CFM, and CMA examinations. Section I of the paper provides background on standard setting methods. Section II describes the Angoff Method of standard setting. Section III discusses the benefits of the Angoff Method of standard setting and describes the CFA, CFM, and CMA experiences with the method. Section IV concludes the paper.

## STANDARD SETTING METHODS

As reported by Mills and Melican [1988], standard setting methods fall into two general categories, *normative* and *absolute*. Normative methods base the passing score on an individual's ranking within a group and thus limit the percentage of examinees passing the exam. Absolute methods base the passing score on some evaluation of either examinees or the exam; such methods are used to establish a cutoff score without regard to the proportion or number of examinees who will pass the exam. Normative methods (e.g., 50 percent of the examinees pass) have the advantage of limiting the number of people who will pass the examination, maintaining level pass rates over time. However, the goal of any high-stakes examination (and certainly the goal of the CFA, CFM and CMA Programs) is not to select a limited number of examinees, but rather to verify a level of competence for each examinee. Under a normative method of setting standards, an exam could be administered to a particularly able group of examinees and some able candidates may not pass simply because there are so many high quality (and high scoring) candidates in that particular pool. Conversely, if the candidate pool is not particularly able, some candidates who have not attained a minimal level of proficiency may pass. These problems may become particularly acute over time as the candidate pool changes in terms of candidates' knowledge, skills, and abilities. Thus normative methods are not usually appropriate when exams are used to make decisions on professional competency. Schoon and Smith [1996] report that the normative approach is used in only approximately three percent of the examination programs that responded to a survey of standard setting methods used by licensure and certification agencies.

As discussed by Schoon and Smith [1996], absolute methods can be divided into two approaches. The first approach is referred to as "standards by directive or authority," in which

the standard is based on a combination of history, tradition, and precedent. Examples of this type of standard would include the common practice at many levels of education of deeming “70 percent of the total available points” as a passing grade. Minimum passing scores determined in this fashion may be deemed unfair to candidates for various reasons. In this methodology, no consideration is given to the properties of the exam or the exam’s individual questions. Clearly, an examination can be designed for which earning 70 percent of the points is either a very strict or lenient standard. More importantly, no consideration is given to the determination of the level of examination performance needed to ensure competent practice of the profession. Despite these shortcomings, approximately 30 percent of the certification and licensure programs surveyed by Fidler [1996] use this type of absolute passing standard.

The second approach to setting an absolute performance standard is referred to as the “criterion-referenced” method and involves linking decisions about examination performance to criteria for acceptable practice of the relevant profession. The objective of these “test-centered” methods is to set a performance standard on the examination with the expectation that those who meet the standard will be judged competent in practice and those who are not judged competent in practice will fail the examination. Examples of this type of method include the Nedelsky [1954], Ebel [1979], and Angoff [1971] methods. The popular Angoff Method is described in the following section.

## **ANGOFF METHOD**

The Angoff Method and its variants are the most commonly used approaches to setting standards on high stakes multiple-choice educational, licensure, and credentialing examinations (Sireci and Biskin [1992], Cizek [1996], and Schoon and Smith [1996]). The Angoff Method

requires a group of standard setting expert judges to consider a sample of just minimally competent examinees. These judges are asked to estimate the proportion of this borderline group that would answer each item on the exam correctly. The estimated performance standard for each judge is determined by summing the item judgments. The resulting “Angoff rating” aggregated for all of the judges is then used as a performance standard for the examination.

Selection and training of judges is a critical aspect of the process. In the case of the CFA Program, all of the judges are CFA charterholders with some type of experience in the investment profession. Additionally, most of the judges have been involved in the grading process (of Level II and III examinations) and have been involved in hiring entry-level financial analysts. In the case of the CFM and CMA Programs, all of the judges hold either the CFM or CMA certification and are either current practitioners or college professors in the fields of management accounting and financial management.

The concept of a minimally competent examinee is the key to successful implementation of the Angoff Method. Various names are given to this hypothetical examinee, including “just qualified candidate” and “minimally acceptable candidate.” Regardless of the terminology used, this just qualified candidate is a hypothetical individual who would just barely perform adequately, as one who has either received the credential (as in the CFM or CMA Programs) or passed the Level I examination (as in the CFA Program). Standard setting judges are asked to focus their attention on the candidate who just meets the minimum requirements for certification, rather than on the average, ideal, or top candidate. As reported by Schoon and Smith [1996], standard setting judges typically need repeated references throughout the standard setting process to a formal summary of the behaviors and performance indicators that represent the just qualified candidate; throughout the Angoff process, the judges must be reminded not to overestimate

candidate ability. In both the CFA and CFM/CMA standard setting exercises, a great deal of time and care is taken to train the judges on the concept of a just qualified candidate and on the knowledge, skills, and abilities of that just qualified candidate.

Before the actual rating begins, the judges are shown several multiple-choice items, without answers, from previous examinations. The judges are asked to review these practice items and estimate the probability of a just qualified candidate answering the items correctly, keeping in mind that with a four-option multiple-choice question the candidate has a 25 percent chance of guessing correctly. After rating the practice items, the judges are given the correct answers and allowed to modify their rating if they think an adjustment is appropriate. The results of each judge are shown, along with the actual *p*-values (percentage of candidates answering correctly) obtained when the items were administered on previous examinations. The judges are then given another opportunity to change their ratings once they see how the candidates actually performed.

After reviewing the results for the practice items, the judges proceed to rate the actual items on the examination. Following the same procedures used for the practice items, answers are given after the initial round of item rating and judges are allowed to reconsider their ratings. After the final results are compiled, the mean of the sum of the ratings is computed; this mean represents the recommended “cut score” or raw score that an examinee must achieve in order to pass the examination.

In the case of the CFA Program, the Angoff results are reported to the AIMR Board of Governors, which uses that input along with several additional factors to determine the final minimum passing score. Similarly, in the case of the CFM and CMA Programs, the results of the Angoff standard setting process are reported to the ICMA Board of Regents, which makes the

final decision on the standard based on the recommended Angoff cut score and other relevant data. The goal and challenge for both programs is to set a standard high enough so that it reliably distinguishes between those who are competent and those who are not, but not so high that the standard excludes those who are competent from meeting the standard. The validity of the credentialing program depends on the validity of this standard.

### **THE CFA, CFM, AND CMA EXPERIENCES**

Determining the minimum level of competence required for certification is always a difficult task. With a designation that has a long history, such as the CFA charter or CMA designation, a primary goal is to apply a standard that is fair in a time series sense. In other words, the current year's candidates should not be held to a higher or lower standard than the standard applied to previous candidates. One of the important benefits of certification programs is the perception that holders of the certification have demonstrated certain levels of competency. If there is a perception that the level of competency has eroded over time and that current candidates are held to a lower standard, then the value of the designation is diminished. Similarly, if current candidates are being held to higher standards than previous candidates, the program is also unfair.

The greatest advantage of the Angoff Method of standard setting is that it focuses the judges on what is actually expected of those candidates who achieve certification. In other words, the standard on the examination is determined by what is expected in practice. Another advantage to the Angoff approach is the opportunity for the judges to see the entire exam as a whole, as the candidate sees it, rather than just one question at a time. Experiencing the exam in

the context of the other questions enables the judges to form a more “realistic” perception of the relative difficulty of the individual questions within the context of the exam itself.

Along with the benefits mentioned above, both the ICMA and AIMR experienced several challenges that were overcome, but that may need further attention in the future. The greatest challenge in the process involves keeping the judges’ focus on the likely performance of the “just qualified candidate.” Often judges will state that the just qualified candidate “should” answer this question correctly. The proper focus is not on what the just qualified candidate “should” do but what he or she “will” do. Judges need to be reminded that the just qualified candidate is not necessarily the person that they would want to hire or even work with. Rather, the just qualified candidate is someone who has minimal competency to move on to the next exam level (in the case of the CFA Program) or to hold the credential (as in the case of the CFM and CMA designations).

Another challenge is resisting the tendency on the part of the judges to revert to the mean. The “outlier” judges may have seen something in the question that made their rating legitimate, and ample time must be allotted to discuss this. Both AIMR and ICMA believe that their standard setting processes have been conducive to discussion of these outliers, but discipline has had to be exercised to resist the tendency to silently accept the majority estimate as being correct. Adequate time and discussion must be planned into the process. Yet another challenge has been the fatigue factor on the part of the judges, who need to maintain focus equally on each question throughout the rating process. Adequate “break time” must be scheduled to mitigate fatigue and enable the judges to maintain their concentration.

## **SUMMARY AND CONCLUSIONS**

As professional certification programs grow in importance, the methodology utilized to determine minimum passing scores will come under increasing scrutiny. The authors believe that the benefits of the Angoff Method in setting passing standards for the CFA Level I and

CMA/CFM exams outweigh the challenges that are encountered. The recommended standards produced by the Angoff process have been objective and rigorous; most importantly, they have been fair to examinees while maintaining the integrity of the designations.

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