

## *Foreword for the PAK Study Notes (IFM Exam)*

Welcome to the PAK Study Manual group (<http://www.pakstudymanual.com/>). PAK is a global leader in providing study notes, video and manuals to FSA level candidates (Quantitative finance and Investment track, Corporate finance and ERM track, Individual life and annuity track, and Retirement Benefit track). **For over 10 years, PAK has consistently helped many FSA students pass the very challenging FSA exams. Some students using PAK resources were able to pass their FSA exams on their first attempt with the maximum score of 10/10.** Because the same rigor and hard work used in producing the FSA level PAK resources were used to produce the current PAK-IFM-study-notes, **PAK is pretty confident of the contribution that the PAK-IFM-study-notes will add to the learning curve of the IFM-candidate.**

The field of finance can reasonably be divided into two major areas:

- **Corporate Finance** (*This area is concerned with the source of funding a corporation: debt versus capital. It looks into the theory/models for determining the cost of these sources of funding. It looks at the overall value of the firm and breaks it down into the value to various stakeholders. It seeks the optimal balance for these sources of funds*) and
- **Derivative pricing** (*This area of finance is primarily concerned with the dynamics of asset prices. It formalizes these dynamics into a specific model for the asset price like the Binomial model and the lognormal model. Then it shows how derivative written on the assets can be priced using the postulated model. It is a very important branch of finance and it continues to engage other industry of the financial sector, like the insurance industry*).

It is therefore no accident that the SOA syllabus for the IFM exam faithfully incorporates those two parts of Finance. In turn, The PAK Study notes for the IFM exam is also divided into two parts:

- **PAK-Part-I: Corporate Finance:** SOA Syllabus **sections 1-5** (40%-60%) and
- **PAK-Part-II: Derivatives pricing:** SOA Syllabus **sections 6-10** (40%-60%)

**PAK-Part-I** contains at least 170 pages and **PAK-Part-II** contains around 450 pages. In addition:

- **PAK-Part-I** and **PAK-part-II** contain clear explanations of all the concepts covered in the official source reading. Many times, they include practice examples designed to nail those concepts.
- **PAK-Part-II** contains over **150 exam-type questions** with detailed solutions. Some questions may appear more difficult than what you may realistically encounter in the SOA exam. However, they are still included in order to enhance your overall understanding of the topics.
- Considering the details of explanations provided in the PAK study notes (**PAK-Part-I** and **PAK-part-II**), one will see that the notes do not require an earlier exposure to the materials in order to master the concepts and pass the IFM exam. The notes can definitely be used as a supplement or a substitute for a formal university class on the topics of derivative pricing and corporate finance (especially for those wishing to pass the IFM exam and not being able to take formal university classes that cover the entire exam syllabus).
- While **Part-I-Corporate-Finance** is completely new to the syllabus (July 2018), **PAK-part-II-Derivatives-pricing** used to be included in the old MFE (Mathematics of financial economics) exam. As such, exam-type questions for PAK-Part-I will be made available at a later point in the future. For now, the student is expected to understand the materials covered in PAK-Part-I and re-work the examples provided in the study notes in order to fix the concept.

The PAK study notes are designed to help students adequately prepare for the IFM exam without 100% reference to the source manuals (including SOA approved papers). The PAK-suggested strategy is to **(i)** Read and master the PAK study notes, **(ii)** work the practice examples and the MOCK questions included in the PAK

study notes and (iii) work the official practice questions from the SOA website, then (iv) re-work (ii) and (iii) until the IFM-candidate can answer all questions independently.

The PAK study notes are organized in a user-friendly format. PAK-Part I contains 5 sections and PAK-Part II contains 5 sections. Each section contained in the study note comprises many inter-connected sub-sections. The table below summarizes the 10 PAK-sections contained in PAK-part-I and PAK-part-II:

Parts	Section ID	PAK Sections	SOA topics	Weight (%)
Part I	1	Mean Variance Portfolio Theory	Mean Variance Portfolio Theory	10-15
	2	Asset Pricing Models	Asset Pricing Models	5-10
	3	Market Efficiency and Behavioral Finance	Market Efficiency and Behavioral Finance	5-10
	4	Investment Risk and Project Analysis	Investment Risk and Project Analysis	10-15
	5	Capital Structure	Capital Structure	10
Part II	6	Introductory derivatives: Forward, futures and ins. Derivatives	Introductory derivatives: Forward and futures	5-10
	7	General properties of options	General properties of options	10-15
	8	Binomial Option pricing models	Binomial Option pricing models	10
	9	Black Scholes Option pricing models	Black Scholes Option pricing models	10-15
	10	Option Greeks and risk management	Option Greeks and risk management	5-10

Each section’s weight is an indication to the number of exam questions that will likely be coming from the particular section. The official source reading comprises:

- 11 chapters from the book: Derivatives Markets (Third Edition), 2013, by McDonald, R.L..
- 9 chapters from the book: Corporate Finance (Fourth Edition), 2017, by Berk, J. and DeMarzo, P.
- IFM-21-18: Measures of Investment Risk, Monte Carlo Simulation, and Empirical Evidence on the Efficient Market Hypothesis.
- IFM-22-18: Actuarial Applications of Options and Other Financial Derivatives.

The feature of the PAK subsections contained in each of the 10 PAK sections is the following:

- The PAK subsections synthesize the theories and concepts from the official source reading,
- The PAK subsections contain examples and practice to illustrate the theories and concepts from the official source reading. Such illustrative examples, not only nail the concepts down, but also constitute example of how the concepts can be tested on a real IFM exam.
- The PAK subsections are inter-connected and assembled in a way that will facilitate a holistic understanding of the official source reading and enhance the overall mastery of the official source reading,
- The PAK subsections are beautifully written, they provide clear and better explanations, illustrative examples to fix the concepts.
- Each of the 5 sections of PAK-Part-II contains a set of 30+ practice exam-type questions (end of section questions) and detailed solutions in addition to the illustrative examples contained in the study notes.
- The PAK subsections are well-organized and user-friendly.

The SOA expects candidates to (i) Read all of the source readings and (ii) work the practice questions set for part I and part II (available on the SOA website). However, there are many practical reasons why the IFM-candidate shall consider the PAK study notes and the PAK-strategy instead:

- At the strategic level, the organization of the study on a by-section-basis as done within the PAK study notes allows the candidate to take advantage of the signal send by the SOA. By communicating the weight for each of the 10 SOA sections on the official syllabus, the SOA is signaling the importance

(in weight not necessarily concept) that they intend to place of each syllabus-section (SOA-topic). **For instance, while preparing for the IFM exam, the candidate shall bear in mind that sections 1, 4, 7 and 9 can make for 60% of the entire exam.**

- A naïve approach to learning will be to simply cover say the Berk/DeMarzo book on corporate finance without visualizing where each chapter of the book (or portion of the chapter) falls within the SOA sections (from 1 to 10). This way, the candidate never gets to appreciate when he/she is studying items for section 1, 2,...and so on. Thus the candidate does not know whether he or she is over-learning portions that carry less weight and under-learning portions that carry more weight. PAK is not doing the naïve approach. PAK adequately selects the chapters from the official source reading that are relevant to every specific topic/section and group them together in one single section.
- At times, the order of chapters in the official source reading is not representative of the way the SOA has put weights on the sections. At other times, the order of chapters in a given book does not necessarily reflect the way the SOA expects you to understand the materials being learnt. There are also situations where the SOA has selected a paper (IFM-21-18/ IFM-22-18 for instance) that comes to complement a specific topic covered in the book. All these situations were factored in when designing the PAK-sections and sub-sections.
- For instance, when McDonald discusses derivatives, the book is looking from the perspective of derivatives as an asset (or a hedge instrument, or a speculative bet). In contrast, SOA paper **IFM-21-18** discusses derivatives from the perspective of the insurance industry: The derivative is a liability that sits on the balance sheet of an insurance company. However, the SOA expects candidates to understand both aspects of derivatives.
- After all, one may simply recognize that the two books (McDonald in Derivatives and Berk in Corporate Finance) included in the official syllabus were not written exclusively for IFM exam takers. As such, the IFM papers (IFM-22-18) and (IFM-21-18) were added to supplement them and make the subject of financial economics more relevant to actuaries-to-be. **PAK strongly believes that blending various parts of the official source readings within the PAK-sections is more of an effective learning strategy and is in line with the way students need to prepare for the IFM exam.**
- Another instance is the Black-Scholes-Merton (BSM) model: McDonald derives the BSM model in chapter 12 by eliminating risk in the hedging portfolio (by using Ito Lemma). However, all of Ito Calculus/stochastic processes have been eliminated from the IFM syllabus (to now be part of the QFI FSA exams). So, to arrive at the BSM model, PAK wants you to learn the ways of the Binomial model and risk-neutral valuation, the lognormal model and the conditional expectation of the risk neutral lognormal model. PAK believes that this is what the SOA wants from IFM-candidates, since there is no more Ito Calculus/stochastic processes in the syllabus and we still have to deal with BSM, lognormal and Binomial. **The problem here is that in McDonald, the lognormal model is discussed in chapter 18, while the BSM model is derived at in chapter 12. So, in order to make the derivation of the BSM (without using Ito Lemma) comprehensive to the IFM exam-taker, the PAK study notes discusses McDonald chapter 18 before McDonald chapter 12.** This will not have come easy to someone following the naïve approach.
- McDonald discusses models of the asset price (Binomial and lognormal) while (IFM-22-18: Actuarial Applications of Options and Other Financial Derivatives) presents various insurance-related derivative (variable annuities for instance). **PAK effectively shows examples of how these instruments can be valued using the models discussed in McDonald (including the Black Scholes model). PAK does not believe that the SOA exam is about retrieving information from IFM-22-18. Rather, PAK believes the IFM-exam will be about using the models presented in**

**McDonald in order to solve the insurance's business problems mentioned in (IFM-22-18).** As such, many MOCK-questions and some illustrative examples are included in the PAK-study-notes to enhance your understanding of how models in McDonald (Binomial, BSM) can be implemented to value the simple guarantees (GMDB and GMMB), and the Equity Index Annuities (Though the EIA was not covered in IFM-22-18, it can be found in the SOA practice questions (the difficult questions) available on the SOA website).

- At the end of the day, the organization of the PAK sections and subsection allows a more efficient learning process. **PAK is very confident of the contribution its study notes brings to the learning process of the IFM-exam-candidate, or any person interested in application of derivatives in insurance in general.**

Best of luck!

**Bell F. Ouelega FSA CERA MAAA CQF**  
**PAK Instructor for IFM Exam, QFI Exams and RP-RB-IRM Exam**

## About the Author of the PAK Study Notes for the IFM Exam:

After completing a Masters degree in Statistical science from the George Washington University (Washington D.C), Bell started his career in Actuarial science as an Actuarial Analyst. Bell completed his ASA (associate of the Society of Actuaries), CERA (Certified Enterprise Risk Analyst) and his fellowship (FSA) in roughly 7 years. Immediately after his FSA, Bell completed his CQF (Certificate in Quantitative Finance) while he was the Director in Quantative Research in the asset and liability management are of life insurance in Des Moines Iowa. While still working with insurance companies, he joined the PAK Study Group as a contributor roughly 5 years ago. He started to write the PAK study notes for the financial economics and the risk management FSA exams. Ever since, Bell has continued to consistently help FSA students pass their exams, especially those of the Quantitative finance/investment track, and those of taking the investment risk management for retirement benefit track. Every session, Bell receives a lot of strong feedback from FSA students. Bell can be reached at his email at ([bell.ouelega@gmail.com](mailto:bell.ouelega@gmail.com)).

### *PAK testimonials (More on our website)*

The QFIC PAK course was an excellent supplement to the core reading materials. **The practice questions and helpful summaries are essential for understanding how very conceptual and abstract concepts from mathematical finance are applied on the exam.** Bell was also a terrific resource and provided thoughtful responses to challenging questions N.M. (QFIC Exam).

Thank you very much for putting the PAK study package for the RP-IRM exam- **I thought the study manual was very helpful and incredibly easy to read. I passed.** Thanks again. P.R. (RP IRM Exam).

Bell, with the help of PAK study manual and your personal explanations, I was able to pass the QFIC exam. The 90 MOCK questions you designed and the solutions you provided saved me. After going through them once, I was able to fly through the past SOA exams easily before the actual sitting. The morning quantitative section for spring 2015 exam was a real blood bath, I found it significantly more difficult than any of the past QFIC exams. Calvin Y (QFI-IRM; QFIC and QFIA).

Bell, **I found the Study Manual and the other PAK materials quite useful for passing the exam.** Thanks for the continued motivation, email exchanges and answering all the syllabus related questions. Don.C (QFIC Exam).

**The PAK Study materials, the proposed study schedule and the grouping of topics, and especially the PAK MOCK problems were very useful.** Thanks so much for a great PACKAGE. Jackson (QFIA Exam).