FMI Learning Series – Session 1

FINANCIAL MODELING BEST PRACTICES

Ten tips to build a world-class model

Webinar for CFA Society Switzerland

January 27, 2021

FMInstitute.com

FMI Learning Series

- Topic 1: Financial Modeling Best Practices: Ten tips to build a world-class model
- Topic 2: Checking and Reviewing a Financial Model: What to do when something goes wrong
- Topic 3 Scenarios and Sensitivities: Predict the future
- Topic 4: Model circularity: Master the most feared topic in Financial Modeling
- Topic 5: Model bloat: Help your models scale (and fix those that don’t)

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WELCOME

Today's Presenter

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Today's Topics

- Introductions
- Modeling Best Practices
- Financial Modeling Institute
- Q&A

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2 Public exams annually

.

In-person/ Virtual

.

Computer-based

.

No multiple choice

.

4 hours

.

Proctored in a controlled environment

Rigorous test to demonstrate modeling acumen and proficiency

Three levels of certification; each recognized as its own designation

FMI
FINANCIALMODELING
INSTITUTE

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Virtual Exams – Started Oct. 2020

- Security and exam integrity through virtual proctoring platform
- Supervision of candidates throughout exam
- Unusual behaviour automatically flagged
- Onscreen activity recorded
- 4 hours, closed book, no multiple choice

Candidates provide their own:

- Computer (only 1 monitor allowed)
- Internet connectivity
- Webcam
- MS Excel
- Quiet, distraction free space

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Recent Feedback

“Since studying for the exam, I build my models from scratch more often. I have become a better financial modeler.”
Jiaming, AFM | Essen, Germany | PWC

“Registering for the AFM was an easy decision since I knew it would compliment my CFA designation.”
Zweli, AFM | Johannesburg, SA | Investment Analyst

“When I interviewed, I was told I was chosen because of my AFM designation.”
Alexander, AFM | Toronto, Canada | FP&A

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BEST PRACTICES

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“Financial Modeling is a Discipline”

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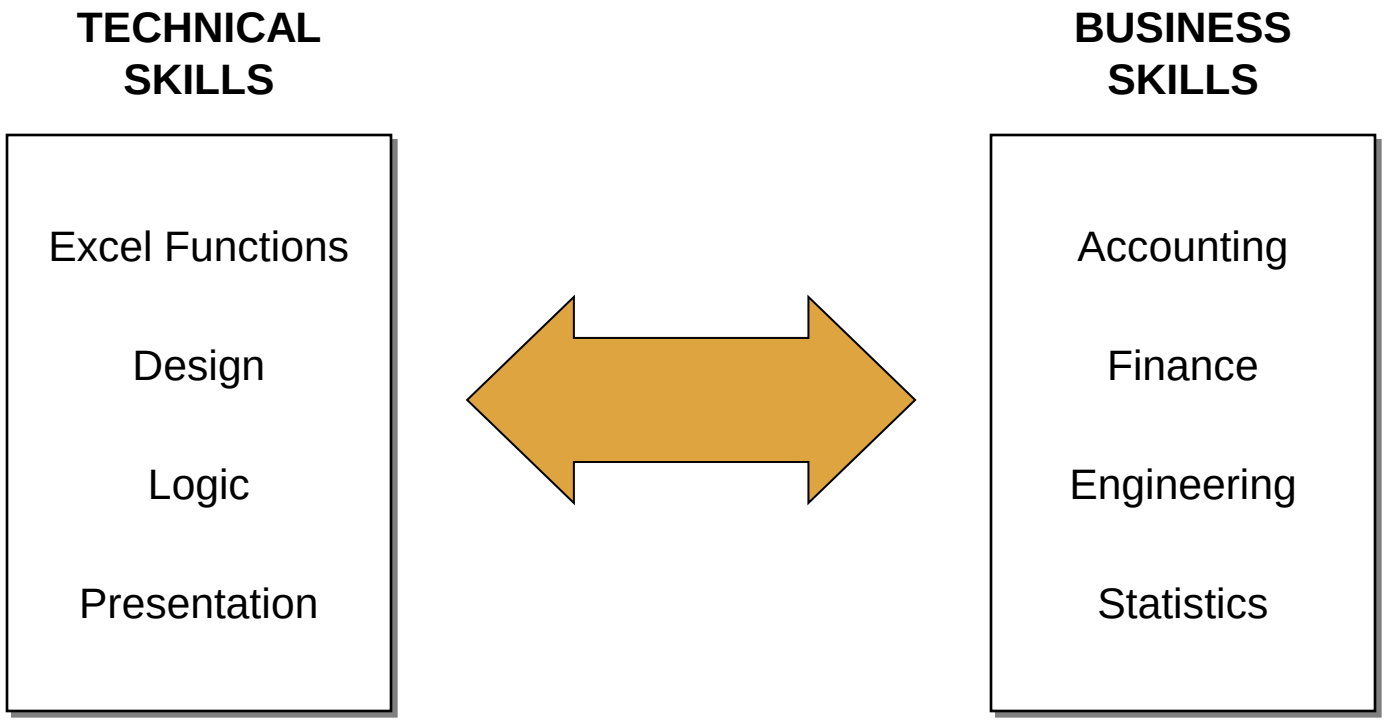
What is a Financial Model?

The integration of technical skills with business / academic skills to create user-friendly decision-making tools



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Modeling Discipline

- A good model needs to be a powerful communication tool so that it can be used to make effective decisions
- The following are important attributes of a strong financial model:
    1. Dynamic
    2. Flexible
    3. Intuitive
    4. Printable
    5. Transparent
    6. Transferable
- When a model achieves the criteria above, it creates tremendous credibility for the builder and inspires confidence with the reader.
- It is also much easier for someone to take ownership of a model that meets the criteria above.
- The one constant for financial models is that they will change over time.

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“Simplicity is the ultimate sophistication”

- Leonardo Da Vinci

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Modeling Basics

- Keep it simple
- NEVER HARDCODE!
  - Always enter inputs as a different colour than calculations
  - Never enter a formula that looks like:

    =A5 * .025 + 4.9
- Use the keyboard to increase speed
- Label everything properly (even excessively)
- Everything should be printable
- Master the basics
- Become an expert at formatting
- Practice

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Modeling Best Practices

The following are some critical modeling best practices:

1. Plan and design a model
2. Ask the right questions
3. Keep the assumptions up front
4. Make data inputs blue – never hardcode data into formulas
5. Build a Scenarios page to avoid multiple versions
6. Use a manageable number of worksheets - build the financial statements vertically
7. Don’t do any work on the financial statements
8. Do all calculations on schedules
9. Build very simple formulas on the schedules
10. Repeat the data, then use it in formulas

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The Planning Process

- It is critical to properly plan and design a model before it can be built
- Whenever a model becomes an illegible error-prone mess, it is almost always because the modeler didn't properly devise a model plan
- To create a strong plan, follow these three steps:
    1. Identify the major issues
    2. Identify all assumptions that need to be made in the model
    3. Identify the required schedules and components (see next page)
- As part of the planning process, you should also be able to answer the following questions:
    - What is the purpose of the model?
    - Which assumptions should become scenarios?
    - How much detail is required?
    - Do I have enough historical detail to validate the amount of forecast detail that is required?
    - What is the important output that the client wants to know?
    - What metric is used to measure results?
    - How many time periods should be included in the forecast? Why?
    - What is the most logical order to present the data?

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Information Gathering

- Gathering the right information is one of the most difficult and important parts of the modeling process
- A good model can help to define the problem and the process
- Don’t assume that the information provided is the right level of detail
- A good financial analyst:
  - asks the right questions and determines the right level of detail required to solve the problem
  - needs to be a critical thinker and realizes that a good financial model facilitates this
  - uses the model to facilitate the organization and flow of the analysis
  - keeps the key players engaged in the process through regular updates and by soliciting feedback
- The model is a means to an end, and not an end in itself
- A model needs to be a powerful communication tool to convey all of the information regarding a particular analysis

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Components of a Financial Model

- Every financial model is made up of worksheets and schedules that fall into the following three categories
- Not all models require every worksheet or schedule listed below, and some models will require other schedules

INPUTS AND OUTPUTS	FINANCIAL STATEMENTS	SCHEDULES
• Model Cover	• Income Statement	• Revenue Schedule
• Summary Output Values	• Cash Flow Statement	• Costs Schedules
• Inputs / Assumptions	• Balance Sheet	• CAPEX / Depreciation Schedule
• Sources and Uses of Capital		• Fixed Asset Schedule
• Scenarios		• Income Tax Schedule
• Sensitivity Tables		• Working Capital Schedule
		• Debt and Interest Schedule
		• Shareholders' Equity Schedule
		• Valuation Schedule
		• WACC Schedule

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Important Modeling Tips

The following are some important tips to adhere to when creating a financial model:

1. Use a manageable number of worksheets (5 to 10 if possible)
2. Keep all inputs and assumptions together, and make sure inputs are ALWAYS blue
3. Never enter the same input twice
4. The model should be flexible so that inputs and assumptions can easily be tested
5. If possible, put all financial statements and schedules on the same worksheet
6. Do not insert blank columns between years
7. Within each worksheet, each year MUST ALWAYS be in the same column when there are multiple schedules beneath one another
8. Include the model title and worksheet title prominently on every page
9. Label every row – have one column that's used just for row labels
10. Include the date and time, page numbers and the file path on every page
11. Incorporate a "live" scenario tag on every page
12. Never delete a cell, row or column until you have determined where it flows (Auditing)
13. Do not make multiple copies of the model with minor revisions – use scenarios
14. Think about how the model will be printed and make sure the data is in page-size units
15. ALWAYS review your model on paper before delivering it to your colleagues or the client
16. Format your model as you go – don't wait until the very end!

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MODELING SKILLS

Custom Formatting a Cell

- Applying custom formatting to cell values is very important to ensure that a cell's contents are clear to the reader
  - Bring the Format Cells dialogue box onto your screen (press Ctrl + 1) or:

Excel 2010

➢ Home [H] ➢ Format [O] ➢ Format Cells [E]

Excel 2013

➢ Home [H] ➢ Format [O] ➢ Format Cells [E]

  - On the "Number" tab, click the "Custom" option at the bottom of the list
  - In the "Type" list on the right, select the number format you want to edit
  - To create a new format, click in the white space under the word "Type"
  - The following rules apply to creating a custom number format:
    - A zero or a number sign (#) is a placeholder for a number
      - a # displays only significant digits, whereas a zero in the custom format box displays insignificant zeros if a number has fewer digits than there are zeros in the format
    - You can specify up to four sections of format codes. The format codes, separated by semicolons, define the formats for positive numbers, negative numbers, zero values, and text, in that order.
    - If you would like a number to begin or end with a ***single character*** (ie. 5.6x), enter the character before or after the number placeholder (ie. enter 0.0x)
    - If you would like a number to begin or end with ***more than one character*** (ie. 25 years), enter the text in quotation marks (ie. enter 0.0 "years")
    - To include a comma separator, enter #,### (12000 will appear as 12,000)
    - A comma at the end of the number placeholder will divide the number by 1000 (ie. 12000 will appear as 12)

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Connecting Strings of Data

- Connecting strings of data is critically important when creating inputs or assumptions pages, or when adding footnotes to tables

  Concatenate Function

  = CONCATENATE(“text1”,A1,“text2”...)

  - Joins text strings and cell references into one text string
  - Especially useful for assumptions pages or footnotes to tables
  - This function does not extract formatting from a cell being referenced
  - Formatting needs to be done manually, or by using the TEXT function
    - Manual: =CONCATENATE(“The tax rate used in the model is ”,E20*100,“%”)
    - TEXT Function: =CONCATENATE(“The dollar amount is ”,TEXT(E21,“$0.00”))

  Ampersand “&”

  - The same functionality as the CONCATENATE function
  - Connects or concatenates multiple text strings and/or cell references to produce one continuous text string
    - e.g. =“The tax rate used in the model is ”&E20*100&“%”

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Creating Scenarios

- IF statements are very powerful logical formulas that are used frequently in financial models
  - An IF Statement is a very powerful modeling tool
  - The IF Function is one of 6 logical operators
  - IF Statements follow an IF, THEN, ELSE, pattern

    =IF(B5>10,G5,H7)

    =IF(C30-C60=0,“OK”,“ERROR”)

  - Embedded (or Nested) IF Statements allow you to include more than one IF statement in a single formula
  - Embedded IF Statements can be used to create switches for assumption scenarios

    =IF(C5=1,D6,IF(C5=2,D7,IF(C5=3,D8,D9)))

  - Other logical operators, such as AND and OR, can be used in conjunction with IF Statements to create even more elaborate formulas (e.g. debt repayment schedules)

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Creating Scenarios

- The Choose function is a simpler and cleaner way of creating scenarios than using an IF Statement

  = CHOOSE(Index_num,Value1,Value2,...)

  – The Choose function chooses a value from a list of values, based on an index number (a switch)

  – The switch must always simply be a number in a cell

  – The following diagram describes the CHOOSE function

Choose Function Example

	A	B	C	D	E	F	G
1							
2	Switch:	**1**		**10%**	=CHOOSE(B2,D4,D5,D6)		
3							
4			Base Case	10%			
5			Best Case	20%	Blue Input Cells		
6			Worst Case	30%			
7							

  – Cell D2 contains the CHOOSE function. The function is first looking at the switch cell (B2). Since the switch cell contains a 1, the CHOOSE function is extracting the contents of cell D4, the first argument in the CHOOSE function after the switch cell reference. If the user changes cell B2 to a 2, cell D2 would change to 20%, the contents of cell D5.

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Timing Flexibility

- There are three ways to build a switch into a model:

1. **1/2 Switching Mechanism**
   - Benefits: you can use CHOOSE or OFFSET
   - You can use drop down boxes to control the switch
   - The problem in an expansion is that you need lots of IF statements

2. **Data Validation**
   - You don't see the drop down arrow unless you click on the cell
   - You need lots of IF statements

3. **1/0 Switching Mechanism**
   - Benefit: much fewer IF statements because everything gets multiplied by the switch
   - Drawback: can't use a dropdown box and the 1/0 doesn’t mean anything
   - Custom Format as follows: [=1]"On";[=0]"Off"

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Running Scenarios

Incorporating Pull Down Menus

- To create a more user-friendly interface on a scenario switch, a pull down menu can be used to control the CHOOSE function
- A pull down menu restricts the values that can be entered into the switch cell, thereby reducing the possibility of causing an error
- Bring the Forms toolbar onto your screen by doing the following:

  Excel 2010: ➢ File [F] ➢ Options [T] ➢ Select the "Customize Ribbon" box ➢ Put a check in "Developer" Tab box ➢ Click Developer menu up top ➢Click the "Insert" button

  Excel 2013: ➢ File [F] ➢ Options [T] ➢ Select the "Customize Ribbon" box ➢ Put a check in "Developer" Tab box ➢ Click Developer menu up top ➢Click the "Insert" button

- Click on the "Combo Box (Form Control)" button and use the crosshair to draw a combo box on your screen
- While the Combo Box is selected, right click and go to ➢ **Format** ➢ **Control**
  - On the "Control" tab, select the range of cells containing the names of the various scenarios in the "Input Range" box
  - On the "Control" tab, enter the switch cell in the "Cell Link" box
- Click OK, then Use your mouse to pull down the arrow and run the scenario

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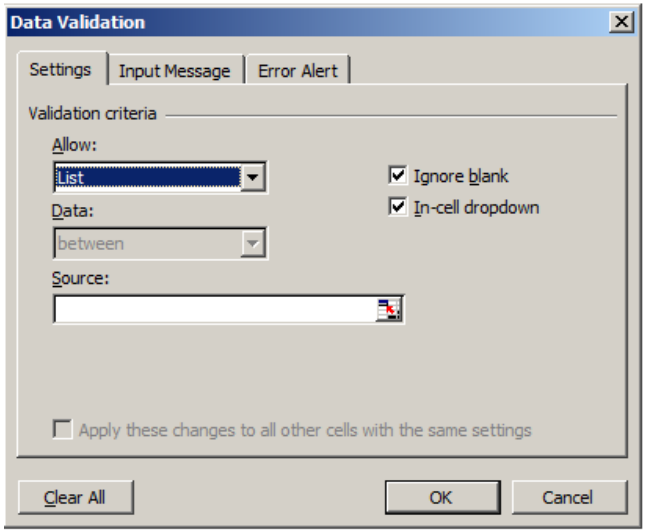
Validation Tool

- One additional way to restrict what a user can enter in a cell is by using Excel's Data Validation Tool.
  - Data validation allows the creator of the spreadsheet to determine exactly what can or cannot be entered into a cell.
  - Go to ➢ **Data**➢ **Validation**
  - From here you can choose what is allowed in a cell (i.e. only whole numbers, decimals, dates, etc.)
  - The List option is the most common selection:
    - When using the List option, you need to highlight a range of cells
    - Then when you click on the cell that contains the validation, a drop-down arrow will appear and the user will be able to choose the option they want.



  - When using Data Validation, you can also choose to prompt a user with warnings and error messages if they attempt to enter something other than what is allowed in the cell.

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Sensitivity Analysis

Goal Seek

Excel 2010

➢ Data [A] ➢What-If Analysis [W] ➢Goal Seek [G]

Excel 2013

➢ Data [A] ➢ What-If Analysis [W] ➢ Goal Seek [G]

- Very simple sensitivity analysis, it back solves equations
- Finds a result for a cell by changing the value of another cell
- You instruct it to set a calculated cell (say A1), to a predetermined value (say 0.55), by changing one other cell

Data Tables

Excel 2010

➢ Data [A] ➢What-If Analysis [W] ➢Data Table [T]

Excel 2013

➢ Data [A] ➢ What-If Analysis [W] ➢ Data Table [T]

- Creates multiple outputs under different input assumptions
- Link the cell in the top left hand corner of your table to the output value in your model that you would like to sensitize, then highlight the entire table
- Select the “Data Table” option from the menu
- In the “Row Input Cell” box, enter the input cell in the model that you would like to sensitize along the horizontal variable of your data table
- In the “Column Input Cell” box, enter the input cell in the model that you would like to sensitize along the vertical variable of your data table

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Conditional Formatting

- This function formats cells that meet pre-specified criteria
  - If you have more than one rule, the first rule will take priority over the second rule, so it's important to enter the rules in the appropriate order
  - The first step is to highlight all data that you want the formatting applied to (when highlighting a column, you must start at the top and highlight down)

Excel 2010

➢ Home [H] ➢ Conditional Formatting [L]

Excel 2013

➢ Home [H] ➢ Conditional Formatting [L]

- There are two ways to conditionally format cells:
  1. Built-In Formatting Rules – formats based on cells that contain certain text, number, or date or time values
     - For example, it is possible to "Format Cells that are GREATER THAN" 25, all values greater than 25 will be formatted
  2. Use a Formula – gives additional flexibility
     - For example, enter the following formula =D2>average($D$2:$D$558), all values larger than the average will be shaded within the range of D2:D558 (think of the = sign at the beginning of the formula as the word "if")
  - The rule that was created will be evaluated as TRUE or FALSE within each cell in the range
    - If the rule is evaluated as TRUE, the selected formatting will be applied
    - If the rule is evaluated as FALSE, the selected formatting will not be applied

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FMI OVERVIEW

FMI Mission, Vision, and Values

MISSION

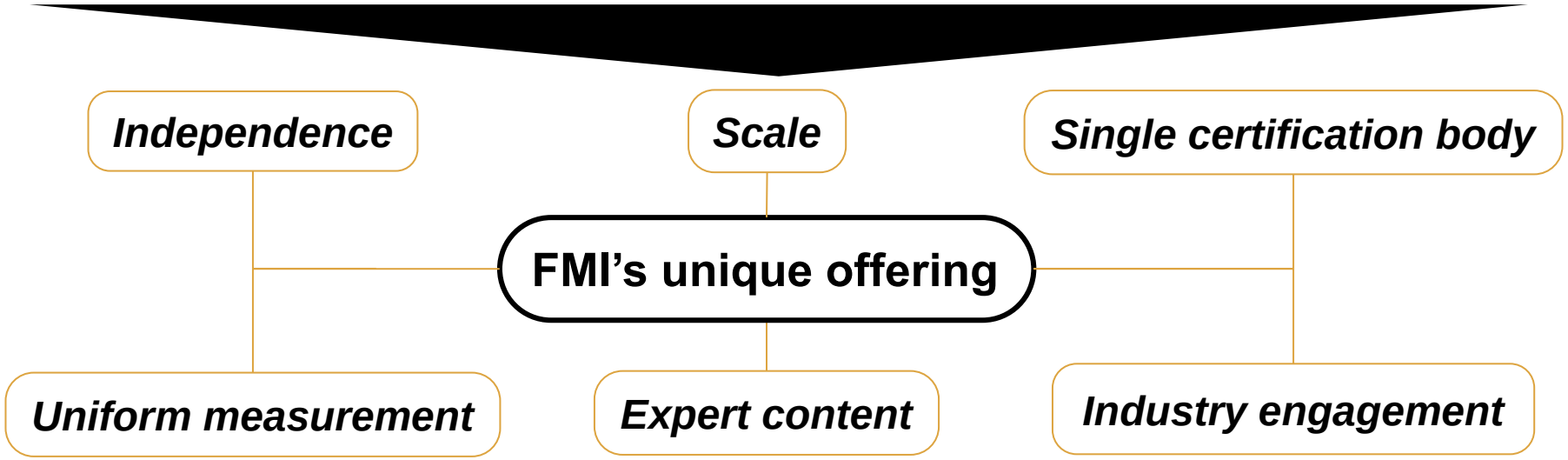
To promote the awareness and discipline of financial modeling globally through world-class exams and accreditation programs.

VISION

Increased awareness and acumen of financial modeling professionals around the world.

VALUES

To seek to represent the interest of the global financial modeling community. We deliver with integrity, excellence and encourage leadership, collaboration and innovation among all candidates and members.



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How Certification Works

1. **Each level is recognized as its own qualification**
2. **Difficulty increases at each new certification level**
3. **Candidates may complete as many subsequent levels as they wish**

LEVEL 1

- Foundational level of certification program
- Proficiency in building beginner-to-intermediate financial models
- Skills in design and comprehension of finance, business, accounting and Excel

LEVEL 2

- Attainable following successful completion of Level 1
- Thorough understanding of real-world applications of financial modeling
- Demonstrated ability in advanced Excel, financial analysis, and financial modeling

LEVEL 3

- Highest level of accreditation achievable
- Expert in the end-to-end financial modeling value chain
- Respected thought leader, mentor, and contributor to financial modeling education

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Why Choose the FMI

Candidates

Accelerate your career in finance by earning a globally recognized certification in financial modeling

SKILL VALIDATION
Demonstrate advanced financial modeling proficiency to employers and clients with independent skills validation

PERSONAL DEVELOPMENT
Invest in yourself by earning certifications that are challenging and revered by the industry

CAREER FLEXIBILITY
Obtain a globally-relevant skillset that is respected across multiple business lines

Employers

Use a globally recognized benchmark for a reliable assessment of financial modeling ability

RISK MITIGATION
Hire professionals who have demonstrated financial modeling abilities at the highest standard

TALENT DEVELOPMENT
Use the FMI curriculum as a validated roadmap to guide training and development

LEADERSHIP
Be a diversity and thought leader by joining the global network of FMI professionals

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How is the FMI Different?

	FMI	Others
OVERALL	***Established to validate financial modeling ability through rigorous, hands-on testing***	***Provided by training companies whose primary business is to sell financial modeling training programs***
TRAINING	Candidates are not required to purchase training. Available training is delivered through non-remunerated third parties	Candidates must purchase the associated training program before they can achieve the certification
EXAMS	Always closed-book and proctored. Candidates are expected to build financial models; no multiple- choice	Usually online, sometimes proctored. Often includes multiple choice questions
CERTIFICATIONS	Level 1 pass rate is approximately 50%. Exams are anonymized and graded manually by two graders and later reviewed by an independent committee. Certifications are publicly verifiable (candidate directory, Basno Badge)	Pass rates are not disclosed but are usually near 100%. Grading is usually automated. Certifications are not publicly verifiable.

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Testing Centers in 32 Global Cities

October 2020 Virtual Exams - candidates can write from anywhere

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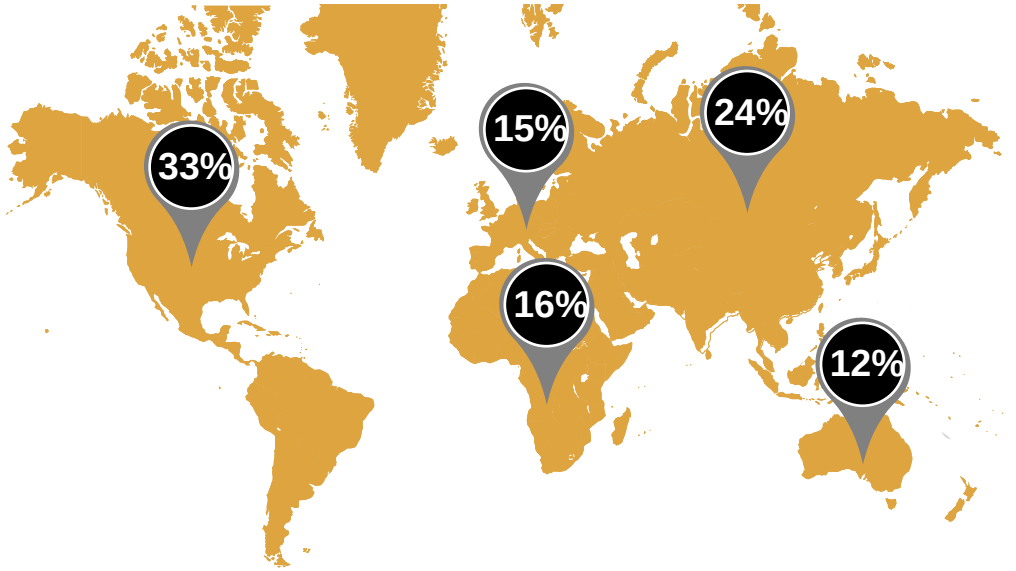
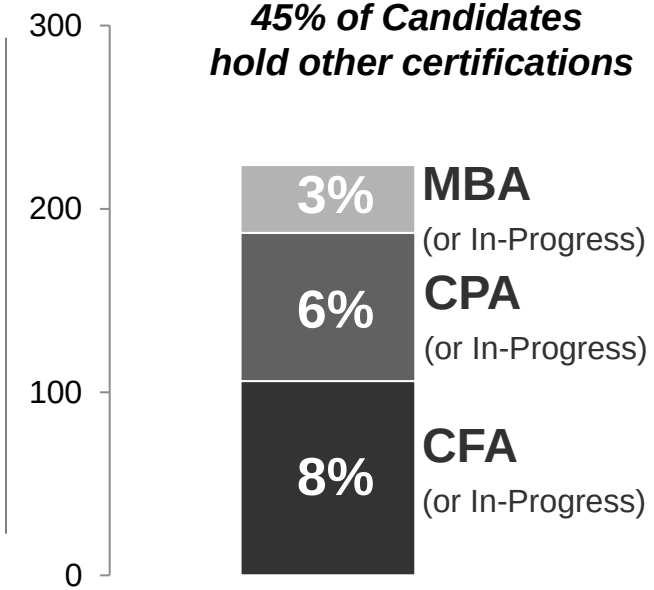
Candidate Demographics

% Candidate Representation by Continent



% Candidates with Designations



Avg. Candidate Age
32 years

Students
21%

Full-time Professionals
70%

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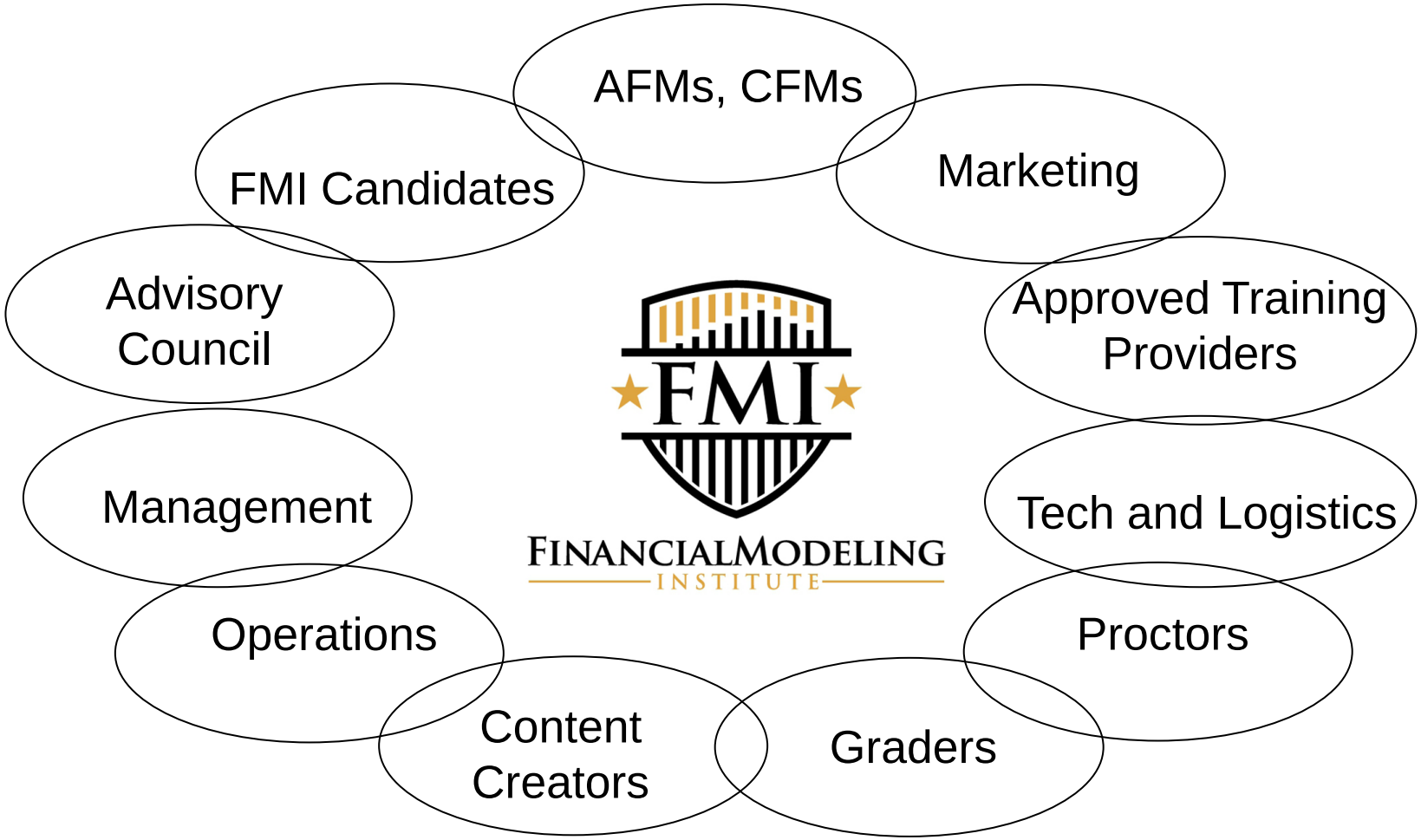
FMI Candidate data as of April 15, 2020

FMI Community



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Certification Structure

Advanced toolkit to build a dynamic 3-statement financial forecast model of a company

- 4-hour exam
- Candidates provided with a case study
- Required to build an interactive financial model of a company

Expert knowledge of various topics (accounting, finance, investments) in financial forecast models

- 4-hour exam
- Candidates required to complete a selection of advanced modeling topics

Focused on application of sophisticated financial concepts and technical understanding of complex business decision-making skills

- 4-hour exam
- Candidates required to complete a selection of master level modeling topics

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Exam Materials

Exam Case

Small section about a company

- Simple company

All the information to build 5 years of assumptions

- Revenues
- Cost, etc…

Bottom is instructions

- Same instructions every exam

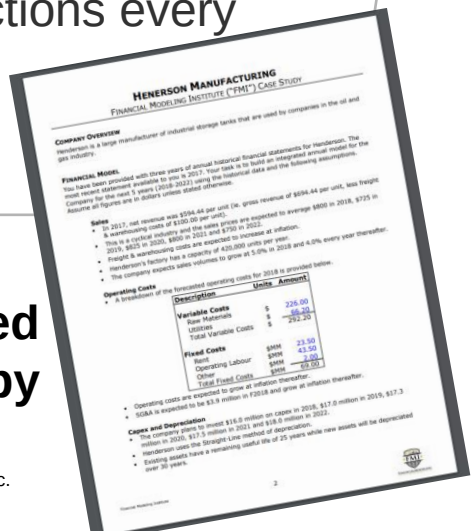
Build a model to forecast 5 years

Exam Worksheet

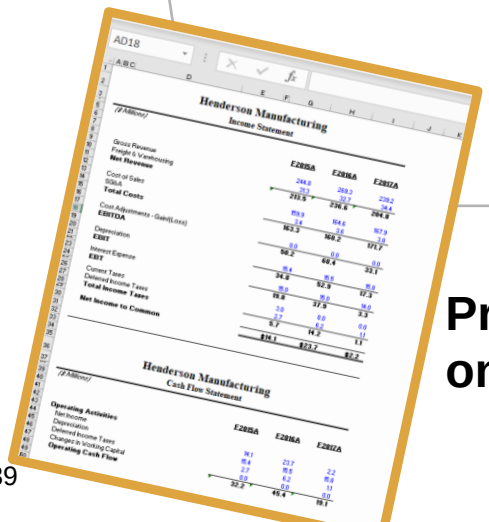
Grading tab to input name and student number

3 years of historical financials

- Balance Sheet
- Income Statement
- Cash Flow



Printed copy



Pre-loaded on computer

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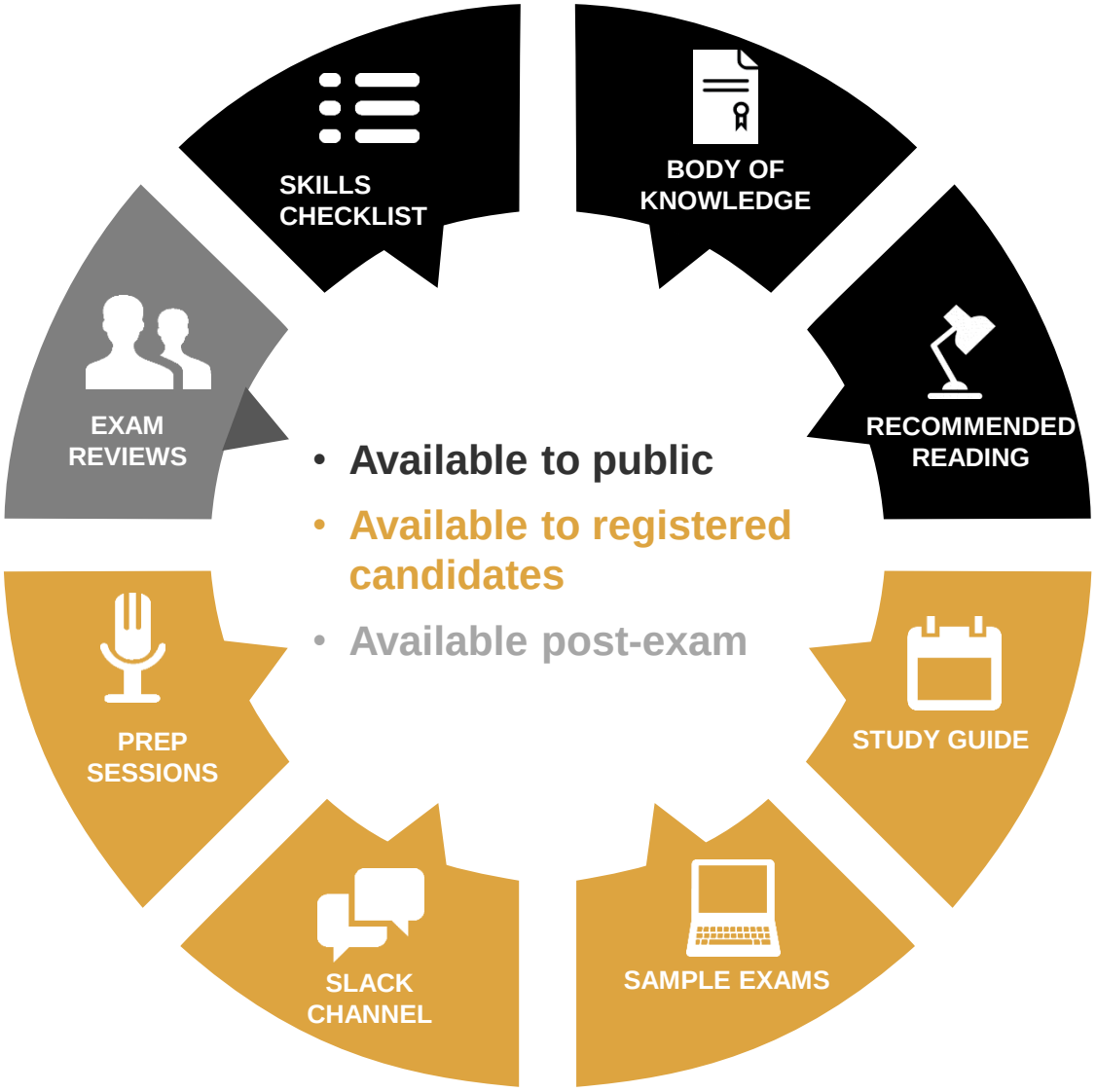
Learning Materials



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Approved Training Providers

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FMI Approved Training Providers current as at April 15, 2020.