

# *Financial Modeling Fundamentals – Module 01*

## *Overview and Core Concepts –*

### *Quiz Questions*

1. **What's an example of how you might reasonably use financial modeling to make a decision in real life?**
  - a. You can use financial modeling to determine whether or not recent drop in a company's share price is justified.
  - b. You use financial modeling to determine the fair value of a new automobile manufactured by Toyota.
  - c. You use financial modeling to determine whether the overall stock market will increase or decrease in the next 12 months.
  - d. You use financial modeling to quantify corporate governance issues at a publicly traded corporation.
  
2. **Which of the following statements is TRUE of financial modeling?**
  - a. It's more of an art than a science.
  - b. It can be more data-gathering-intensive than math-intensive.
  - c. You should aim to be "vaguely right" rather than "precisely wrong."
  - d. It lets you quantify your views of a company's possible future performance.
  - e. All of the above.

**3. Which of the following are the key steps in ANY financial modeling process?**

- a. Step 1 – Determine the Investment Thesis; Step 2 – Collect Financial Data; Step 3 – Determine the Intrinsic Value; Step 4 – Run Sensitivity Analyses; Step 5 – Prepare the Investment Memorandum; Step 6 – Defend the Investment Thesis.
- b. Step 1 – Determine the Purpose; Step 2 – Do Background Reading; Step 3 – Determine the Key Drivers; Step 4 – Gather Data; Step 5 – Build the Model; Step 6 – Present Your Conclusions.
- c. Step 1 – Develop “Bull Case” Estimates; Step 2 – Collect Sell-Side Equity Research; Step 3 – Interpret the Data; Step 4 – Complete the Valuation; Step 5 – Run Sensitivity Analyses; Step 6 – Make an Investment Decision.
- d. Step 1 – Collect Data; Step 2 – Interpret the Data; Step 3 – Build the Model; Step 4 – Determine the Key Drivers; Step 5 – Gather Data; Step 6 – Present Your Conclusions.

**4. If you're an investment banker and you create a financial model for a client, which of the following might you recommend based on that model?**

- a. You might advise the client to consider an acquisition.
- b. You might advise the client to raise capital.
- c. You might advise institutional investors to buy the company's stock.
- d. You might advise the client to accept a direct investment from your firm.
- e. Both answer choices #1 and #2.
- f. Both answer choices #3 and #4.
- g. All of the above.

5. Is it better to pay a deposit for 75% of an apartment worth \$500,000, pay no monthly rent, and then get the deposit back after 5 years, or to put down a 10% deposit, pay monthly rent of \$2,500, and then get the deposit back at the end?
- It depends on how much you could earn with the money you save as a result of the lower deposit.
  - It's almost always better to pay no monthly rent since you'll save \$150,000 over five years like that.
  - It's almost always better to pay the 10% deposit since you'll save \$325,000 initially if you do that.
  - It depends on annual apartment price appreciation in your area.

6. Consider the scenario shown in the diagram below, where we are considering renting an apartment in Korea worth \$500,000 USD. Under Option #1, we would pay a 75% deposit, pay no rent over 5 years, and receive back the deposit in Year 5. Under Option #2, we would pay a 5% deposit and receive it back in Year 5, but we would also pay MONTHLY rent equal to 0.5% of the \$500,000 each month.

BIWS - Financial Modeling Fundamentals - The Time Value of Money  
(\$ in Thousands)

Once Upon a Time at an Apartment in Korea

Apartment Value: \$ 500.0

Option #1:

Deposit %: 75.0%  
Deposit: \$ 375.0

Option #2:

Deposit %: 5.0%  
Deposit: \$ 25.0

Monthly Rent %: 0.5%  
Monthly Rent: \$ 2.5  
Annual Rent: 30.0

Option #1 - Large Upfront Deposit	Sign-Up:	Year 1	Year 2	Year 3	Year 4	Year 5
Annual Rent:	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Deposit (Paid) / Received Back:	(375)	-	-	-	-	375
<b>Net Cash Flow:</b>	<b>\$ (375)</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 375</b>

"Money Lost": \$ -

Option #2 - Smaller Deposit + Rent	Sign-Up:	Year 1	Year 2	Year 3	Year 4	Year 5
Annual Rent:	\$ -	\$ (30)	\$ (30)	\$ (30)	\$ (30)	\$ (30)
Deposit (Paid) / Received Back:	(25)	-	-	-	-	25
<b>Net Cash Flow:</b>	<b>\$ (25)</b>	<b>\$ (30)</b>	<b>\$ (30)</b>	<b>\$ (30)</b>	<b>\$ (30)</b>	<b>\$ (5)</b>

"Money Lost": \$ (150)

When does it make more financial sense to rent the apartment under Option #2, with a lower deposit, rather than Option #1?

- Never, because you always lose money with Option #2 when you pay rent – since you can never recover money spent on rent.
- Whenever your “opportunity cost” (i.e., what you could earn on investments elsewhere) is ABOVE approximately 7.4%, Option #2 makes more sense than Option #1.
- Whenever the opportunity cost is ABOVE approximately 7.0%, Option #2 makes more sense than Option #1.
- Whenever the opportunity cost is BELOW approximately 7.0%, Option #2 makes more sense than Option #1.

7. You are considering purchasing an apartment in order to rent it out to tenants, sell it to someone else after 5 years, and earn a return on your investment. The apartment’s asking price is \$500,000 USD, and you believe it will appreciate to \$600,000 by the end of 5 years. You expect that the cash flow generated by rent will initially be \$30,000, which then increases by \$3,000 per year. You could earn a 5% return by investing in other, similar real estate assets. Your analysis for this investment is shown below:

BIWS - Financial Modeling Fundamentals - Present Value (PV), Net Present Value (NPV), IRR, and the Discount Rate (WACC)  
(\$ in Thousands USD)

**Present Value and How to Use It with the Discount Rate**

"Asking Price" (Initial Investment):	\$ 500
Initial Annual Cash Flow from Rent:	30
Annual Increase in Cash Flow from Rent:	3
Apartment Sale Value:	600
Our Opportunity Cost ("Discount Rate"):	5.0%

Cash Flows:	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Cash Flow from Rental Income:	\$	30	\$ 33	\$ 36	\$ 39	\$ 42
Property Sale:		-	-	-	-	600
<b>Net Cash Flows:</b>	<b>\$</b>	<b>30</b>	<b>\$ 33</b>	<b>\$ 36</b>	<b>\$ 39</b>	<b>\$ 642</b>

<b>Present Value (PV):</b>	<b>\$ 625</b>
----------------------------	---------------

<b>Should We Invest?</b>	<b>Yes</b>
--------------------------	------------

Under the current assumptions, this is a definite “Invest” decision since the Present Value of cash flows exceeds the initial investment. Which of the following changes would turn this into a “DO NOT INVEST” decision?

- If our opportunity cost were 10% rather than 5%, it would not make sense to buy this apartment for \$500,000.
- If the apartment’s value did not increase at all, and we only sold it for \$500,000 in Year 5, it would not make sense to buy it for \$500,000 in the beginning.
- If the apartment’s initial cash flow from rent were only \$10,000 rather than \$30,000, it would not make sense to buy it for \$500,000 in the beginning.
- None of the above – i.e., we SHOULD still invest even if ANY SINGLE assumption were changed as described in the preceding answer choices.

8. Sir Richard Branson of Virgin has approached you and asked about two different business ideas he has. He wants to either launch Virgin Galactic to transport ultra-wealthy individuals from Earth to Jupiter and back, or launch Virgin Asia to provide low-cost air transport services in Southeast Asia. His financial analyst has presented the following spreadsheet to you, which shows the 5-year IRR from both initiatives:

BIWS - Financial Modeling Fundamentals - Present Value (PV), Net Present Value (NPV), IRR, and the Discount Rate (WACC)  
 (£ in Millions GBP)

**Your Exercise: Help Sir Richard Branson Invest His Money!**

Virgin - Assumptions and WACC by Division:	WACC:
Virgin - Entire Company:	10.0%
Virgin Galactic:	14.0%
Virgin Asia:	8.0%
Initial Investment Required for Jupiter Fleet:	£ 2,000
Annual Cash Flows Earned from Trips to Jupiter:	250
Resale / Long-Term Value of Fleet Beyond Year 5:	2,500

Cash Flows from Jupiter Fleet:	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Cash Flows from Jupiter Trips:	£ -	£ 250	£ 250	£ 250	£ 250	£ 250
Fleet (Purchase) / Sale:	(2,000)	-	-	-	-	2,500
<b>Net Cash Flows:</b>	<b>-£ 2,000</b>	<b>£ 250</b>	<b>£ 250</b>	<b>£ 250</b>	<b>£ 250</b>	<b>£ 2,750</b>

**Internal Rate of Return (IRR): 16.1%**

Initial Investment Required for Virgin Asia Aircraft:	£ 400
Annual Cash Flows Earned from Virgin Asia:	20
Resale / Long-Term Value of Aircraft Beyond Year 5:	450

Cash Flows from Virgin Asia:	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Cash Flows from Virgin Asia:	£ -	£ 20	£ 20	£ 20	£ 20	£ 20
Aircraft (Purchase) / Sale:	(400)	-	-	-	-	450
<b>Net Cash Flows:</b>	<b>-£ 400</b>	<b>£ 20</b>	<b>£ 20</b>	<b>£ 20</b>	<b>£ 20</b>	<b>£ 470</b>

**Internal Rate of Return (IRR): 7.2%**

**What should you tell Sir Richard Branson based on this analysis?**

- a. The Virgin Galactic initiative makes more sense than the Virgin Asia one because the Virgin Galactic IRR of 16.1% is over twice as high as the Virgin Asia IRR.
  - b. The Virgin Galactic initiative makes more sense because its IRR of 16.1% exceeds the company-wide WACC of 10.0%, while the Virgin Asia IRR of 7.2% is below the 10.0% threshold.
  - c. The Virgin Galactic initiative makes more sense because its 16.1% IRR exceeds the Virgin Galactic WACC of 14.0%, while the Virgin Asia IRR of 7.2% is below the Virgin Asia WACC of 8.0%.
  - d. Neither option makes sense because in most cases, companies attempt to earn a division-level IRR at least twice as high as their division-level WACC.
- 9. Suppose that a company's "asking price" (market value) is 50% less than the present value of its cash flows, and that you could earn a potential IRR of 25% on it compared to your opportunity cost of 15%. It also has significant pricing power, no major competitors, and carries significant tax benefits for you. Why might you choose NOT to invest?**
- a. It might be engaging in illegal activity, or activity likely to draw the attention of regulators.
  - b. It might be doing something ethically questionable, such as overcharging poverty-stricken customers who have no other options thanks to the broken healthcare system in the US.
  - c. It might be harming society as a whole, even if it is financially successful.
  - d. All of the above.