



Financial Modeling & Forecasting

Jason MacMorran

www.pncpa.com

Presentation Outline

- I. Introduction and Learning Objectives
- II. Definitions and Standards Overview
- III. Uses for Financial Models
- IV. Basics of Financial Modeling
- V. Basics of Financial Analysis
- VI. Sensitivity and Scenario Analysis
- VII. Conclusion

Learning Objectives

- Understand accounting standards related to prospective information.
- Discuss uses and applications for financial models, including uses as decision making tools.
- Understand basic design and creation of a financial model.
- Understand uses for financial analysis and sensitivity analysis.

Definitions and Standards Overview

Definitions and Standards Overview

- The words projection, forecast, pro forma, model, etc., are often used interchangeably relative to prospective information.
- In an accounting context, they have different meanings.
- Generally speaking, the projection, forecast, pro forma or budget will be the 'output', and the financial model will include the 'inputs' and 'output'.
- This section is not intended to be authoritative or a detailed look at standards, but a general overview of what to look for and where to find it!

Key Accounting Terms

- Forecast – presents an entity's **expected** financial position, results of operations, and cash flows, based on responsible party's assumptions reflecting conditions it **expects** to exist and actions it **expects** to take.
- Projection – presents an entity's financial position, results of operations, and cash flows, based on one or more **hypothetical** (what ifs) assumptions provided by a responsible party.
- Hypothetical Assumption - an assumption used to present a condition or course of action that is not necessarily expected to occur, but is consistent with the purpose of the projection (i.e. expansion scenario).

Key Accounting Terms

- Financial Analysis – practitioner develops assumptions, analyzes results, and recommends a course of action.
- Partial Presentation – a presentation of prospective financial information that excludes one or more of the items required for prospective financial statements.
- Responsible Party – person or persons responsible for assumptions underlying the prospective financial statements.

Types of Presentations

- Prospective Information
 - Prospective Financial Statements
 - Forecast
 - Projection
 - Prospective, but not Financial Statements
 - Partial presentations
 - Financial analyses
- Not Prospective Information
 - Pro forma, based on historical amounts
 - Expired budgets

Uses of Prospective Information

- General Use – use by persons with whom the responsible party is not directly negotiating, for example:
 - Offering of debt or equity securities under SEC regulations.
 - Offering of tax-exempt bonds.

- Limited Use – use only by the entity with whom the responsibly party is negotiating, for example:
 - Private placement.
 - Negotiating bank financing.
 - Merger negotiations.

- Internal Use – solely for use by the responsible party.

Uses of Prospective Information

Type of Prospective Presentation	Appropriate Uses		
	General Use	Limited Use	Internal Use
Forecast	Yes	Yes	Yes
Projection	No	Yes	Yes
Partial Presentation	No	Yes	Yes
Financial Analysis	No	Yes	Yes

Types of Engagements

- Third-party Use:
 - Special disclaimer on current year budgets – practitioners may not be required to apply any procedures if they make certain disclaimers.
 - Compilation – assembling prospective statements in conformity with presentation guidelines and issuing report.
 - Agreed-upon procedures – varies by engagement, and can be very limited or quite extensive.
 - Examination – evaluating assumptions and presentation of financial information and issuing report.
- Internal Use:
 - Assembly – no type of assurance, does not require report.

Independence

- Independence is required in examination and agreed-upon procedures engagements, but not in compilation or internal use engagements because no assurance is expressed.

Exceptions

- Litigation and valuation projects often have exceptions to procedure and presentation rules, so long as they are properly disclaimed.

Key Finance Terms

- Net Present Value – present value of expected future cash flows minus initial investment.
- Internal Rate of Return – discount rate at which investment has zero net present value.

Resources

- Accounting
 - AICPA Attestation Standards
 - AICPA *Guide for Prospective Financial Information*
 - AICPA *Practice Aid 06-2 Preparing Financial Models*
 - PPC's *Guide to Forecasts and Projections*

- Finance
 - Brealey & Myers *Principles of Corporate Finance*

Uses for Financial Models

Background

- Financial models should tell a story.
 - What is the business going to do?
 - How is it going to do it?
 - How is it reflected in the financials?
- Financial models capture the future operating, investing and financing activities that determine future profitability, financial position, and risk.
- Financial models should be comprehensive, internally consistent, and externally reasonable.

Background

- Financial models can integrate elements of accounting, finance, economics, corporate psychology, and business philosophy.
- Accounting based models – compilations for investors / creditors.
- Finance / economics based models – decision making (net present value, internal rate of return, etc.).
- Psychology / Philosophy – In a 'decision making' model, how will competitors react to your planned actions? Does the plan involve risks you know you're unwilling to take?

Uses for Financial Models

- Financing (debt or equity)
- Buy vs. Lease
- Valuation
- Budgeting
- Business Plans
- Strategic Plans
- Expansion
- Merger / Acquisition
- Lost Profits
- Business Interruption
- Litigation Support
- Start-ups
- Contraction / Closure

Financial Models in Everyday Life

- A 'financial model' does not have to be complex!
- Simple situations call for simple financial models:
 - Buy vs. lease of vehicle
 - Impact of change in interest rate on borrowing
 - Payback period on an investment
- Complex situations call for complex financial models:
 - Merger and acquisition pro-forma and future cost savings
 - Entering new markets / launching new products
 - Litigation

Basics of Financial Modeling

Basics of Financial Modeling

- Define the need
- Basic organization
- Sample construction
- Other layout considerations

Define the Need

- What is the desired goal of the financial model?
 - Launching a new product? Integrating a potential acquisition? Refinancing debt?
- Who is the expected user?
 - Management? Investors? Bankers?
- What is the expected use?
 - Internal? External?
- The above issues will govern the sophistication and reporting requirements of a financial model.

Define the Need

- Presentation / engagement will depend on purpose and audience.
- May require complete financial statements over a defined time period.
- May require limited information over a defined time period.
- May require 'one-time' sources and uses of funds.

Complete Financial Statements

- Most difficult and time consuming to prepare, but also most instructive to user:
 - Balance Sheet – measures future liquidity and leverage
 - Income Statement – measures future operating results
 - Statement of Cash Flows – outlines future cash needs for growth (investment and borrowing) and returns to investors
- Collectively, complete financial statements can help measure return on investment and potential risks.

Limited Information

- Most common, including:
 - Prepare a twelve month budget
 - Six months of start-up expenses
 - Amortize a loan over five years
- Do not necessarily have to be financial statements!

Sources and Uses of Funds

- Where is money coming from (bank debt, equity, etc).
- What is it going to be spent on (equipment, refinance, operating costs, etc).
- Often seen in refinancing and bond offerings.

SOURCES AND USES

		<u>Contribution</u>	<u>Cap %</u>
<u>Sources</u>			
Cash on Hand	\$	500	0.6%
Bank Revolver		0	0.0%
Senior Bank Note		20,000	23.4%
Subordinated Bank Note		5,000	5.8%
Owner Contribution		10,000	11.7%
New Equity		50,000	58.5%
<i>Total Sources</i>	<u>\$</u>	<u>85,500</u>	<u>100.0%</u>
<u>Uses</u>			
Purchase new equipment	\$	10,000	11.7%
Operating costs		25,000	29.2%
Office manager		40,000	46.8%
Refinance Existing Debt		0	0.0%
Working Capital		10,000	11.7%
Cash		500	0.6%
<i>Total Uses</i>	<u>\$</u>	<u>85,500</u>	<u>100.0%</u>

Time Period

- Generally, time period should match the business life cycle.
 - 5 year projection for a 20 year real estate deal may not be helpful.
 - 20 year projection in a rapidly changing industry may not be relevant.
 - How to handle changes in the economy?
- For litigation or damage oriented models, time period should correspond to period of damage.

Basic Organization

- Most financial models include the following basic elements:
 - Identification of the problem to be solved (buy vs. lease, expansion, new location, etc.)
 - Key assumptions (sales growth, margins, capital expenditures, impact of competitors, etc.)
 - Output / results (financial statements, net present value, go / no go decision, etc.)

Sample Construction

- Problem - Client / Employer wants to expand an existing product into a new geographic market (new location).
- Which question is better:
 - Will the project be profitable?
 - Will the project provide an adequate return on investment?
- Accounting based financial statements will show profitability.
- Net present value / internal rate of return analysis will show return on investment.

Sample Construction - Scope

- 'Problem' and expected use/users will define scope of financial model.
- In the case of expansion / new location, the following factors should be considered:
 - Will be a long-term project
 - Will likely require significant investment (equity and /or debt)
 - Will likely require consideration of competitor reactions
- Based on this 'problem' and expected use/users, output should be complete presentation over a long-term, with consideration of 'return' on the investment.

Sample Construction - Assumptions

- What are key assumptions?
 - Will vary by client and industry
 - May be impacted by current economic environment in short-term
- Critical points:
 - Assumptions should be defined separately (i.e. a separate 'tab' in Excel workbook); often referred to as 'projection drivers'
 - Assumptions should be reasonable and logical
 - Assumptions should be supported by historical trends, industry trends, economic data, or other data (will discuss later)
- Bad assumptions = bad decisions!

Sample Construction - Assumptions

Sample Company

Projection Assumptions

Growth Rates						
Line Item	Year 1	Year 2	Year 3	Year 4	Year 5	Terminal
Revenues		5%	5%	5%	5%	5%
Salaries		5%	5%	5%	5%	5%
Benefits		5%	5%	5%	5%	5%
Supplies		5%	5%	5%	5%	5%
Licenses		5%	5%	5%	5%	5%
Utilities		5%	5%	5%	5%	5%
Repairs and maintenance		5%	5%	5%	5%	5%
Insurance		5%	5%	5%	5%	5%
Telephone		5%	5%	5%	5%	5%
Management fees		5%	5%	5%	5%	5%
Miscellaneous		5%	5%	5%	5%	5%

Accounts Receivable						
	Year 1	Year 2	Year 3	Year 4	Year 5	Terminal
Assumed days outstanding	70	70	70	70	70	70
Accounts receivable turnover	5.21	5.21	5.21	5.21	5.21	5.21
Projected Net Sales	\$ 953,135	\$ 1,000,792	\$ 1,050,831	\$ 1,103,373	\$ 1,158,542	\$ 1,216,469
Projected accounts receivable	\$ 182,793	\$ 191,933	\$ 201,529	\$ 211,606	\$ 222,186	\$ 233,295

Accounts Payable						
	Year 1	Year 2	Year 3	Year 4	Year 5	Terminal
Assumed days outstanding	14	14	14	14	14	14
Accounts payable turnover	26.07	26.07	26.07	26.07	26.07	26.07
Projected Operating Expenses, less Int & Depr	\$ 718,244	\$ 751,156	\$ 785,714	\$ 822,000	\$ 860,100	\$ 900,105
Projected accounts payable	\$ 27,549	\$ 28,811	\$ 30,137	\$ 31,529	\$ 32,990	\$ 34,525

Sample Construction – Income Statement

- Easiest place to start:
 - Core assumptions relate to operations (growth rates, margins, etc.)
 - Operations not 'dependent' on balance sheet or cash flows
- When appropriate, separate fixed and variable costs.
- If model is very detailed, consider separate worksheets for departments, revenues, cost of revenues, operating expenses, etc.
- Separating the model into smaller parts helps to catch errors!

Sample Construction – Income Statement

Sample Company

Projected Income Statements

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Terminal</u>
Revenues	\$ 953,135	\$ 1,000,792	\$ 1,050,831	\$ 1,103,373	\$ 1,158,542	\$ 1,216,469
Operating Expenses						
Salaries	286,043	300,345	315,362	331,131	347,687	365,071
Benefits	42,906	45,051	47,304	49,669	52,153	54,760
Supplies	187,585	196,964	206,812	217,153	228,011	239,411
Licenses	8,000	8,400	8,820	9,261	9,724	10,210
Lease	60,000	60,000	60,000	60,000	60,000	60,000
Utilities	12,000	12,600	13,230	13,892	14,586	15,315
Repairs and maintenance	59,710	62,696	65,830	69,122	72,578	76,207
Insurance	28,000	29,400	30,870	32,414	34,034	35,736
Telephone	3,000	3,150	3,308	3,473	3,647	3,829
Interest	3,375	2,758	2,113	1,440	736	-
Management fees	30,000	31,500	33,075	34,729	36,465	38,288
Miscellaneous	1,000	1,050	1,103	1,158	1,216	1,276
Depreciation	<u>140,533</u>	<u>140,533</u>	<u>140,533</u>	<u>150,533</u>	<u>150,533</u>	<u>-</u>
Total Operating Expenses	<u>862,152</u>	<u>894,447</u>	<u>928,360</u>	<u>973,972</u>	<u>1,011,368</u>	<u>900,105</u>
Operating Income	90,983	106,344	122,471	129,400	147,173	316,364
Less: Provision for Income Taxes	<u>(22,746)</u>	<u>(26,586)</u>	<u>(30,618)</u>	<u>(32,350)</u>	<u>(36,793)</u>	<u>(79,091)</u>
Net Income	<u>\$ 68,237</u>	<u>\$ 79,758</u>	<u>\$ 91,853</u>	<u>\$ 97,050</u>	<u>\$ 110,380</u>	<u>\$ 237,273</u>

Sample Construction – Balance Sheet

- Often more difficult to model, mostly because cash balances are 'iterative' (turn on Excel feature).
- Working capital (receivables, inventory, payables) projected from assumptions, such as days outstanding / turnover ratios.
- Capital expenditures need to support expected level of operations.
- Financing (debt / equity) will depend on capital needs, working capital requirements, etc.
- Retained earnings will roll from net income.

Sample Construction – Balance Sheet

Sample Company

Projected Balance Sheets

	Year 1	Year 2	Year 3	Year 4	Year 5	Terminal
ASSETS						
Current Assets						
Cash	\$ 366,367	\$ 564,455	\$ 773,599	\$ 946,853	\$ 1,182,298	\$ 1,409,996
Accounts receivable	<u>182,793</u>	<u>191,933</u>	<u>201,529</u>	<u>211,606</u>	<u>222,186</u>	<u>233,295</u>
Total Current Assets	<u>549,160</u>	<u>756,387</u>	<u>975,128</u>	<u>1,158,459</u>	<u>1,404,484</u>	<u>1,643,292</u>
Fixed Assets						
Fixed assets, at cost	748,450	748,450	748,450	798,450	798,450	798,450
Accumulated depreciation	<u>(140,533)</u>	<u>(281,066)</u>	<u>(421,599)</u>	<u>(572,132)</u>	<u>(722,665)</u>	<u>(722,665)</u>
Total Fixed Assets, net	<u>607,917</u>	<u>467,384</u>	<u>326,851</u>	<u>226,318</u>	<u>75,785</u>	<u>75,785</u>
Total Assets	<u>1,157,077</u>	<u>1,223,771</u>	<u>1,301,979</u>	<u>1,384,777</u>	<u>1,480,269</u>	<u>1,719,077</u>
LIABILITIES & EQUITY						
Liabilities						
Accounts payable	27,549	28,811	30,137	31,529	32,990	34,525
Notes payable	<u>61,291</u>	<u>46,964</u>	<u>31,993</u>	<u>16,349</u>	<u>(0)</u>	<u>(0)</u>
Total Liabilities	<u>88,840</u>	<u>75,776</u>	<u>62,130</u>	<u>47,877</u>	<u>32,990</u>	<u>34,525</u>
Equity						
Capital contributions	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Retained earnings	<u>68,237</u>	<u>147,996</u>	<u>239,849</u>	<u>336,899</u>	<u>447,279</u>	<u>684,552</u>
Total Equity	<u>1,068,237</u>	<u>1,147,996</u>	<u>1,239,849</u>	<u>1,336,899</u>	<u>1,447,279</u>	<u>1,684,552</u>
Total Liabilities and Equity	<u>\$ 1,157,077</u>	<u>\$ 1,223,771</u>	<u>\$ 1,301,979</u>	<u>\$ 1,384,777</u>	<u>\$ 1,480,269</u>	<u>\$ 1,719,077</u>

Sample Construction – Cash Flow

- Connect the parts from the Balance Sheet and Income Statement.
- Consider a 'T=0' time period for initial investments (capital expenditure, debt financing, equity financing, etc).
- Is there a minimum 'days cash on hand' to start with? This will influence financing requirements.
- Cash balances are 'iterative' (turn on Excel feature).

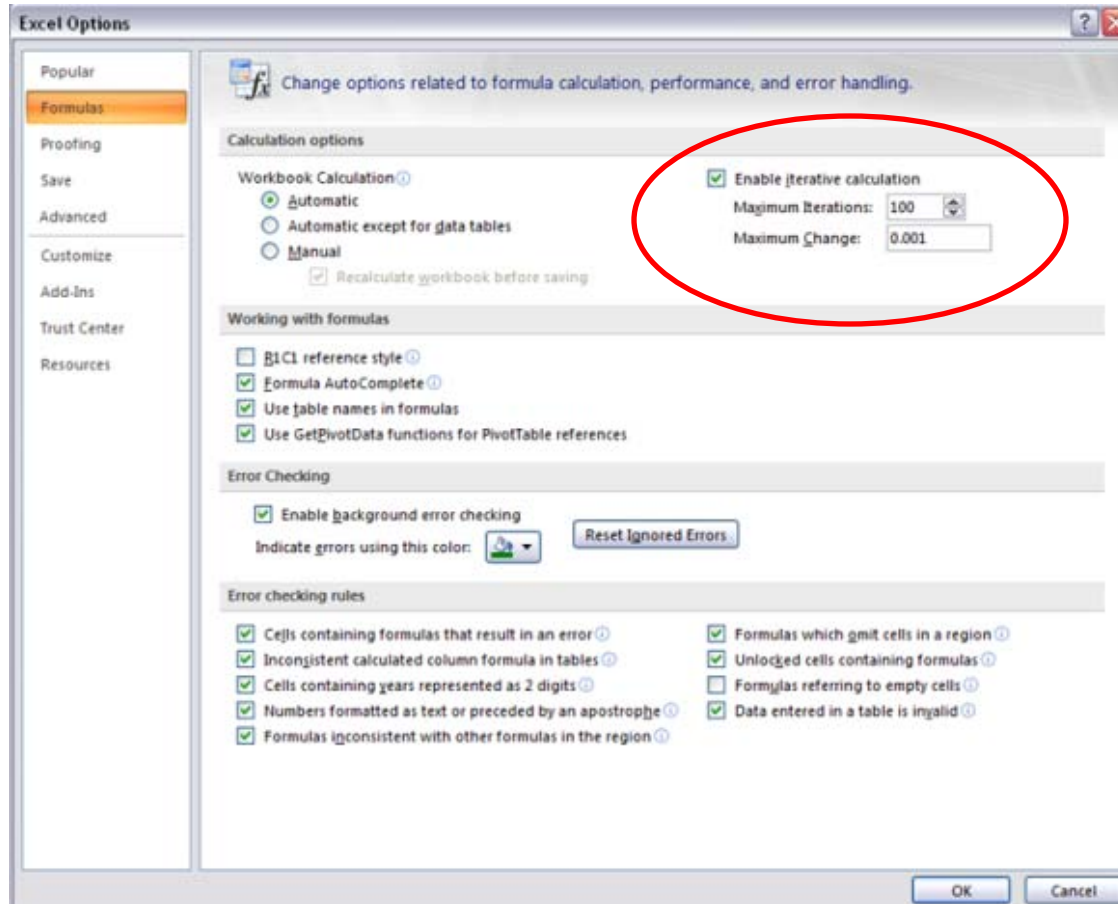
Sample Construction – Cash Flow

Sample Company

Projected Cash Flows

	T=0	Year 1	Year 2	Year 3	Year 4	Year 5	Terminal
Cash Flows from Operating Activities							
Net Income	\$ -	\$ 68,237	\$ 79,758	\$ 91,853	\$ 97,050	\$ 110,380	\$ 237,273
Adjust for non-cash items							
Depreciation	-	140,533	140,533	140,533	150,533	150,533	-
Adjust for changes in:							
(Increase) decrease in accounts receivable	(174,089)	(8,704)	(9,140)	(9,597)	(10,076)	(10,580)	(11,109)
Increase (decrease) in accounts payable	<u>26,347</u>	<u>1,202</u>	<u>1,262</u>	<u>1,326</u>	<u>1,392</u>	<u>1,461</u>	<u>1,534</u>
Net Cash Provided (Used) by Operations	<u>(147,742)</u>	<u>201,268</u>	<u>212,414</u>	<u>224,115</u>	<u>238,899</u>	<u>251,794</u>	<u>227,698</u>
Cash Flows from Investing Activities							
Capital expenditures	<u>(748,450)</u>	-	-	-	<u>(50,000)</u>	-	-
Net Cash Used in Investing	<u>(748,450)</u>	-	-	-	<u>(50,000)</u>	-	-
Cash Flows from Financing Activities							
Loan proceeds	75,000	-	-	-	-	-	-
Member contributions	1,000,000	-	-	-	-	-	-
Principal payments	-	<u>(13,709)</u>	<u>(14,326)</u>	<u>(14,971)</u>	<u>(15,645)</u>	<u>(16,349)</u>	-
Net Cash Provided (Used) by Financing	<u>1,075,000</u>	<u>(13,709)</u>	<u>(14,326)</u>	<u>(14,971)</u>	<u>(15,645)</u>	<u>(16,349)</u>	-
Net Increase in Cash	178,808	187,559	198,088	209,144	173,254	235,445	227,698
Cash, Beginning of Year	-	<u>178,808</u>	<u>366,367</u>	<u>564,455</u>	<u>773,599</u>	<u>946,853</u>	<u>1,182,298</u>
Cash, End of Year	\$ 178,808	\$ 366,367	\$ 564,455	\$ 773,599	\$ 946,853	\$ 1,182,298	\$ 1,409,996

Sample Construction – Iterative Calculations



Sample Construction – Cash Flows

- Most overlooked in financial modeling, but most important.
- Statement of Cash Flows shows:
 - Timing of capital expenditures for growth
 - Additional borrowing needs
 - **Ability to provide return on investment**
- Cash flows available to investors (free cash flows) is a core element in financial decision making, and is essential to a net present value analysis or an internal rate of return analysis.

Sample Construction – Decision Making

Sample Company

Decision Making

	T=0	Year 1	Year 2	Year 3	Year 4	Year 5	Terminal
EBIT		\$ 94,358	\$ 109,103	\$ 124,584	\$ 130,840	\$ 147,909	\$ 316,364
Less: tax on EBIT		<u>(23,590)</u>	<u>(27,276)</u>	<u>(31,146)</u>	<u>(32,710)</u>	<u>(36,977)</u>	<u>(79,091)</u>
After-tax EBIT		70,769	81,827	93,438	98,130	110,932	237,273
Add: depreciation	N/A	140,533	140,533	140,533	150,533	150,533	-
Less: capital expenditures		-	-	-	(50,000)	-	-
Less: working capital requirements		<u>(7,502)</u>	<u>(7,877)</u>	<u>(8,271)</u>	<u>(8,685)</u>	<u>(9,119)</u>	<u>(9,575)</u>
Free Cash Flows to Debt and Equity		<u>\$ 203,799</u>	<u>\$ 214,483</u>	<u>\$ 225,700</u>	<u>\$ 189,978</u>	<u>\$ 252,346</u>	<u>\$ 227,698</u>
Free Cash Flows to Debt and Equity	\$ (1,075,000)	\$ 203,799	\$ 214,483	\$ 225,700	\$ 189,978	\$ 252,346	\$ 1,138,490
Present Value	(1,075,000)	186,042	163,162	143,080	100,362	111,091	501,203
Net Present Value		<u>\$ 129,942</u>					
Required Rate of Return		<u>20%</u>					

Other Layout Consideration

- Have a summary tab that provides the 'answer' concisely.
- Have designated 'input only' tabs and clearly delineate variables.
- Link and cross-link worksheets
- Use Excel formulas:
 - If/then
 - Average and median
 - Lookup
 - Forecast
 - Trend

Basics of Financial Analysis

Why Perform Financial Analysis?

- Projection assumptions can be supported by historical financial analysis.
- Basic financial analysis tools include:
 - Common size financial statements
 - Ratio analysis
 - Trend analysis
 - Industry comparatives
- Financial analysis tools and techniques can:
 - Isolate trends (positive and negative).
 - Help identify strengths and weaknesses.

Common Size Financial Statements

- Income Statement line items as a percentage of revenues:
 - Identify changes in cost of sales, gross profits, and operating expense margins over time.
- Balance Sheet line items as a percentage of total assets:
 - Identify changes in (and composition of) current assets and liabilities, fixed assets, debt, and other balances sheet items over time.
- Are margins and compositions expected to stay the same in the future?
- Why have margins changed? Were the changes expected?

Ratio Analysis

Ratio analysis can assist with understanding and projecting:

- Growth
- Cost control
- Asset turnover
- Profitability
- Risk
- How these ratios have changed (or not) over time.

How do ratios compare to benchmarks?

- Integra Information (www.integrainfo.com)
- RMA Statement Studies (www.statementstudies.org)
- Trade associations

Ratio Analysis

Growth Ratios

- Growth in revenues
- Growth in expenses
- Growth in earnings

Cost Control Ratios

- Often common size income statement / margins

Turnover Ratios

- Receivable turnover
- Inventory turnover
- Payable turnover
- Total asset turnover

Ratio Analysis - Example

Sample Company

Projection Assumptions

Growth Rates						
Line Item	Year 1	Year 2	Year 3	Year 4	Year 5	Terminal
Revenues		5%	5%	5%	5%	5%
Salaries		5%	5%	5%	5%	5%
Benefits		5%	5%	5%	5%	5%
Supplies		5%	5%	5%	5%	5%
Licenses		5%	5%	5%	5%	5%
Utilities		5%	5%	5%	5%	5%
Repairs and maintenance		5%	5%	5%	5%	5%
Insurance		5%	5%	5%	5%	5%
Telephone		5%	5%	5%	5%	5%
Management fees		5%	5%	5%	5%	5%
Miscellaneous		5%	5%	5%	5%	5%

Accounts Receivable						
	Year 1	Year 2	Year 3	Year 4	Year 5	Terminal
Assumed days outstanding	70	70	70	70	70	70
Accounts receivable turnover	5.21	5.21	5.21	5.21	5.21	5.21
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Accounts Payable						
	Year 1	Year 2	Year 3	Year 4	Year 5	Terminal
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Ratio Analysis

Profitability Ratios

- Return on Assets (ROA)
- Return on Equity (ROE)
- Return on Investment (ROI)

Risk Ratios

- Leverage
- Interest coverage
- Current ratio

Financial Analysis

Beware the pitfalls:

- Ratios can be complicated by accounting methods:
 - How do comparable companies report inventory, depreciation, etc.
 - GAAP allows for different treatments, and different accounting treatments can skew ratio output.
- Ratios are 'industry dependent':
 - CPA firms use different ratios than manufacturing firms
 - Be cautious of 'rules of thumb'

Financial analysis tools are diagnostic; they do a better job of raising questions than providing answers!

Sensitivity and Scenario Analysis

Sensitivity Analysis

Sensitivity Analysis

- How does the projection respond to different 'shocks'?
- Important to know which variables and assumptions are most influential in your model.

Scenario Analysis

- Run multiple scenarios:
 - Measure outcomes of events with different influences.
 - Often used to see best case and worst case.
- Used to establish a range of cash flows for the company, but does not necessarily increase confidence in 'decision'.

Monte Carlo Analysis

Monte Carlo analysis:

- Measures outcomes of events with random influences and assigns probabilities based on frequency.
- Can run tens of thousands of potential scenarios in seconds.
- Does not give you 'THE' answer, but gives confidence in the range of answers for a set of variables.

Conclusion

Parting Thoughts

- Be sure to define the problem and expected use.
- Support the assumptions.
- Consider alternative scenarios.
- Provide the right output for the expected user.

Questions



Contact Information

Jason MacMorrان, CPA/ABV, CVA, CFF, MS

Postlethwaite & Netterville, APAC

8550 United Plaza Blvd., Suite 1001

Baton Rouge, LA 70809

225.408.4766

jmacmorrان@pncpa.com