

EXECUTIVE SUMMARY

Description of the business and Overview of the system

Much of the financial information available has been prepared timely and transparent but there is so much out there (e.g. Annual reports were approximately 10,000 words in 1995 and now they average 60,000 words. Furthermore there are more than 500 unique SEC filings) that is hard to distinguish the relevant from the irrelevant in order to make informed business decisions.

The purpose of our project was to automate all the hard work process of sorting through all the information to summarize the profitability (in terms of operational and non-operational activities), probability of bankruptcy, and the quality of their earnings in just one click. Furthermore we provide charts associated with the key ratios to identify trends and opportunities.

For this project we used sophisticated frameworks of three outstanding financial experts. The Penman Decomposition, created by Stephen Penman and Doron Nissim, helps investors to dig into a firm's financial statements by separating the profitability into the core operating performance and the financing effects. The Beneish Model, created by Professor Messod Beneish, is based in eight financial ratios to describe the degree to which the earnings of a company have been manipulated. The Altman's Z-score, created by Edward Altman, is based in five financial ratios to calculate the likelihood of bankruptcy of a manufacturing company in a two-year span.

This program can be used by securities analysts, investors, lenders, investment bankers, management consultants, corporate managers, and others who want to be informed about the financial health of any company listed in the financial markets.

Implementation documentation

- 1) Summary page
 - a. In this page we only ask for three inputs in order to run the analysis. We validate that the ticker is a valid one and we only allow two different values from a drop down menu. Finally we require a statutory tax rate.

FINANCIAL STATEMENTS ANALYSIS	
Inputs	
<i>Ticker</i>	SAP
<i>Period to Analyze</i>	Annual
<i>Statutory Tax Rate</i>	0.375

Analyze

2) Ribbon.

- a. We emphasized our code to be very simple while at the same time very powerful so we only created two buttons. One to clear the information (graphs, sheets and results) and the other to run the complete analysis & show results.

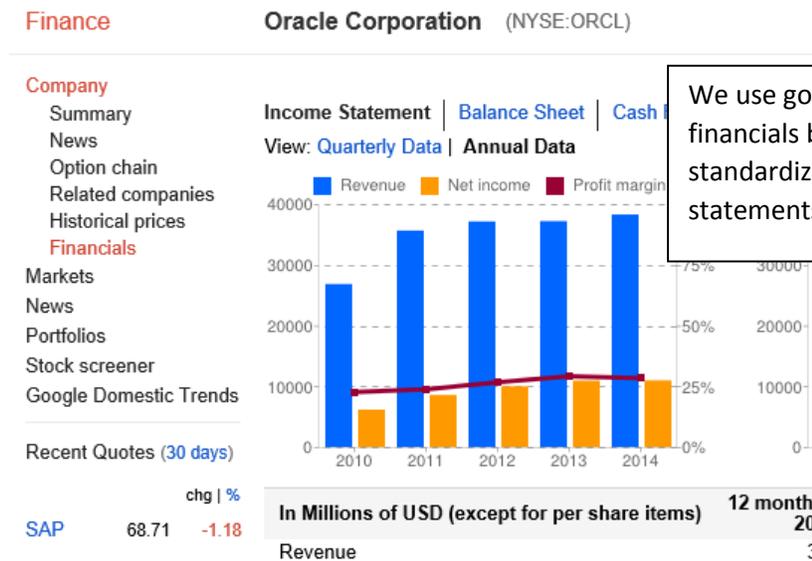
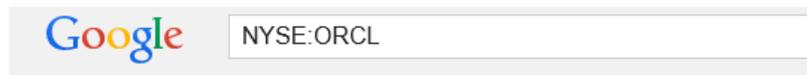


3) Module: Analyze

- a. Clear Old Sheets – The first thing we do is to clear all the sheets that are not related with our main page which is called “Summary”. We do this in order to avoid duplicity of information and also because we have different charts in the main page associated with other sheets. This also deletes all the graphs and information in the Summary sheet.



- b. Extract Data – In this process we open a web page and extract all available data in that page and store it in a sheet called “data”. In this process we received the ‘Ticker’ provided by the user in the main page in order to access the correspondent webpage with the financial information associated with it.



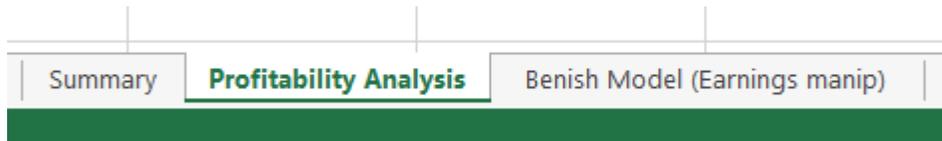
	A	B	C
35	News		
36	Option chain		
37	Related companies		
38	Historical prices		
39	Financials		
40	Markets		
41	News		
42	Portfolios		
43	Stock screener		
44	Google Domestic Trends		
45			
46	Recent Quotes (30 days)		
47			
48	You have no recent quotes		
49	chg %		
50	SAP	68.72	-1.1867 R
51			
52	Oracle Corporation financials		
53			
54	Watch this stock		
55	Income Statement		
56	Balance Sheet		
57	Cash Flow		
58	View: Quarterly Data Annual Data		
59	Hide charts		
60	In Millions of USD (except for per share items)	3 months ending 2014-08-31	3 months ending 2014-05-31
61	Revenue	8,596.00	11,320.00
62	Other Revenue, Total	-	-
63	Total Revenue	8,596.00	11,320.00

This is an example of the raw data extracted from the webpage.



This is the worksheet where we save the data temporarily.

- c. Build New Sheets – We setup all the sheets required to receive and organize the data in the order we want them.



- d. Clean Data – Once we have the data we need to be sure that we only keep information that is useful. In order to do this we eliminate all the rows and information not related to the financial statement analysis. We end up from the raw data showed in the previous step to the following example.

	A	B	C
1	In Millions of USD (except for per share items)	3 months ending 2014-08-31	3 months ending 2014-05-31
2	Revenue	8,596.00	11,320.00
3	Other Revenue, Total	-	-
4	Total Revenue	8,596.00	11,320.00
5	Cost of Revenue, Total	1,681.00	2,207.00
6	Gross Profit	6,915.00	9,113.00
7	Selling/General/Admin. Expenses, Total	1,982.00	2,231.00
8	Research & Development	1,329.00	1,348.00
9	Depreciation/Amortization	547	568
10	Interest Expense(Income) - Net Operating	-	-
11	Unusual Expense (Income)	94	57
12	Other Operating Expenses, Total	-	-
13	Total Operating Expense	5,633.00	6,411.00
14	Operating Income	2,963.00	4,909.00
15	Interest Income(Expense), Net Non-Operating	-	-
16	Gain (Loss) on Sale of Assets	-	-
17	Other, Net	66	-52
18	Income Before Tax	2,718.00	4,588.00
19	Income After Tax	2,184.00	3,646.00
20	Minority Interest	-	-
21	Equity In Affiliates	-	-
22	Net Income Before Extra. Items	2,184.00	3,646.00
23	Accounting Change	-	-

We also identify where the different information is located based upon the information provided by the user (Annually or quarterly) and we assign them a specific range. In the following example is shadowed the Income Statement Annually whereas in the rows above the information is related to Income Statement Quarterly. We do that for the Income Statement, Balance Sheet and Statement of Cash Flows.

	A	B	C
40 Basic EPS after Stock Based Comp. Expense	-	-	-
41 Diluted EPS after Stock Based Comp. Expense	-	-	-
42 Depreciation, Supplemental	-	-	-
43 Total Special Items	-	-	-
44 Normalized Income Before Taxes	-	-	-
45 Effect of Special Items on Income Taxes	-	-	-
46 Income Taxes Ex. Impact of Special Items	-	-	-
47 Normalized Income After Taxes	-	-	-
48 Normalized Income Avail to Common	-	-	-
49 Basic Normalized EPS	-	-	-
50 Diluted Normalized EPS	-	0.5	0.81
51 In Millions of USD (except for per share items)	12 months ending 2014-05-31	12 months ending 2013-05-31	
52 Revenue		38,275.00	37,180.00
53 Other Revenue, Total	-	-	-
54 Total Revenue		38,275.00	37,180.00
55 Cost of Revenue, Total		7,236.00	7,379.00
56 Gross Profit		31,039.00	29,801.00
57 Selling/General/Admin. Expenses, Total		8,605.00	8,134.00
58 Research & Development		5,151.00	4,850.00
59 Depreciation/Amortization		2,300.00	2,385.00
60 Interest Expense(Income) - Net Operating	-	-	-
61 Unusual Expense (Income)		224	-252
62 Other Operating Expenses, Total	-	-	-
63 Total Operating Expenses		23,356.00	22,606.00

Also, we ensure it is in the format we need it and also with the values we required. Mainly we make sure to change the character “-” (this value refers to not available data) into zeros in order to make the necessary calculations for ratios.

A	B	C	
In Millions of USD (except for per share items)	3 months ending 2014-08-31	3 months ending 2014-05-31	3 mc
Revenue	8,596.00	11,320.00	
Other Revenue, Total	0	0	
Total Revenue	8,596.00	11,320.00	

4) Module: Profitability

- Setup Layout – We prepare the table layout where we insert the calculated ratios.
- Adjust dates – We take the date from the titles in order to leave them in the appropriate format for charts
- Identify variables in the spreadsheet – We identify 19 different values (Sales, Operating Assets, provision for tax income, etc) in the corresponding financial statements for each period in order to create 13 different ratios or calculations.
- Fill the tables – We fill “Summary” with just 3 key ratios. If the user wants to have a deeper understanding of any of those 3 ratios he/she should refer to the “Profitability Analysis” sheet which provides the detailed information.
- We call the module called Format
- We call the module called Chart

Profitability Analysis				
	12/31/2013	12/31/2012	12/31/2011	12/31/2010
ROE	22.05%	20.90%	30.53%	
RNOA	41.14%	43.04%	70.20%	
RFF	-19.09%	-22.14%	-39.68%	
FLEV	-0.1073	-0.1294	-0.2125	
Spread	177.83%	171.17%	186.70%	
NOPAT	5,539	5,026	6,221	
NOA	14,030	12,897	10,457	7266
NNO	-2,010	-1,228	-2,242	-2541
NNE%	-136.69%	-128.13%	-116.50%	
NOPM	32.94%	30.98%	43.71%	
NOAT	1.2489	1.3893	1.6062	

5) Module: Manipulation

- Setup Layout – We prepare the table layout where we insert the calculated ratios.
- Adjust dates – We take the date from the titles in order to leave them in the appropriate format for charts
- Identify variables in the spreadsheet – We identify 28 different values in the corresponding financial statements for each period in order to create 8 different ratios or calculations.
- Fill the tables – We fill “Summary” with just the final score “Y” and we use the function of normal distribution in order to create a probability of earnings manipulation. If the user wants to have a deeper understanding of any of the probability he/she should refer to the “Beneish Model (Earnings manip)” sheet which provides the detailed information.
- We call the module called Format
- We call the module called Chart

Beneish Model				
		12/31/2013	12/31/2012	12/31/2011
Probability		0.52%	0.59%	0.77%
Y		-2.56	-2.52	-2.42
Days of Sales in Receiv:	0.92	0.96	0.98	0.95
Gross Margin Index	0.53	0.98	1.01	0.97
Asset Quality Index	0.40	0.98	1.35	0.87
Sales Growth Index	0.89	1.04	1.14	1.19
Depreciation Index	0.12	0.99	0.90	0.81
Selling, General, Admin	-0.17	0.99	1.12	0.98
Leverage Index	-0.33	0.89	1.23	0.73
Total Accruals to Total /	4.68	-0.02	-0.04	-0.01
Intercept	-4.84			
Manipulator?		FALSE	FALSE	FALSE

6) Module: Bankruptcy

- a. Setup Layout – We prepare the table layout where we insert the calculated ratios.
- b. Adjust dates – We take the date from the titles in order to leave them in the appropriate format for charts
- c. Identify variables in the spreadsheet – We identify 13 different values in the corresponding financial statements for each period in order to create 5 different ratios or calculations.
- d. Fill the tables – We fill “Summary” with just the final score “Z-score” which indicates the probability of bankruptcy within 2 years. If the user wants to have a deeper understanding of the probability he/she should refer to the “Beneish Model (Earnings manip)” sheet which provides the detailed information.
- e. We call the module called Format
- f. We call the module called Chart

Altman's Z-Score					
		<u>12/31/2013</u>	<u>12/31/2012</u>	<u>12/31/2011</u>	<u>12/31/2010</u>
Z-Score		7.58	6.88	8.02	7.24
Net Working Capital	1.20	0.04	0.01	0.15	0.10
Retained Earnings	1.40	0.60	0.53	0.54	0.47
EBIT	3.30	0.16	0.14	0.21	0.11
MVE	0.60	9.24	8.37	9.67	9.21
Sales	1.00	0.62	0.62	0.61	0.58
Bankrupt likelihood?		FALSE	FALSE	FALSE	FALSE

7) Module: Format

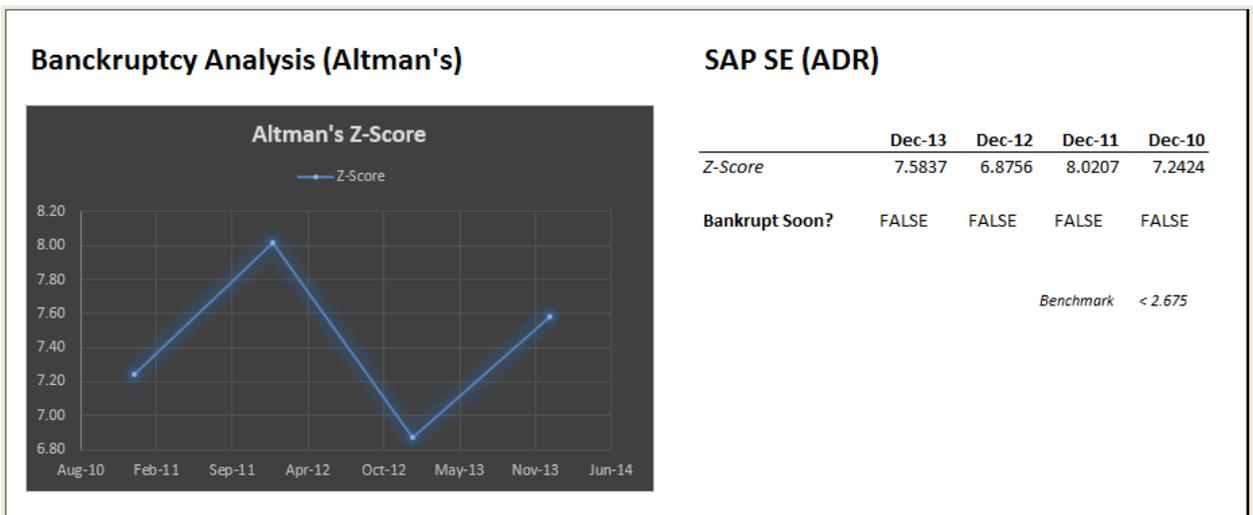
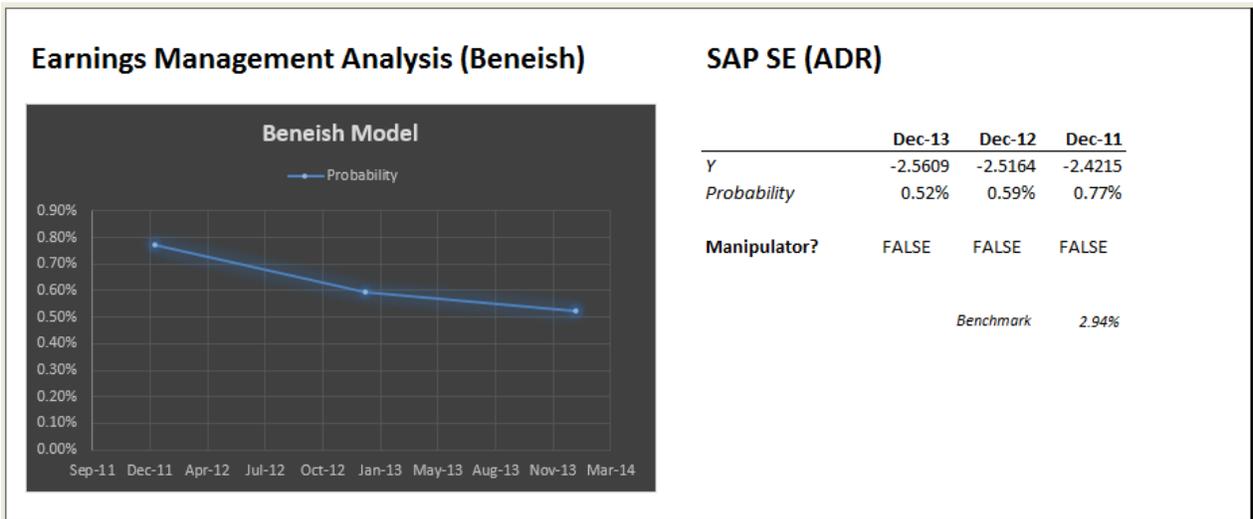
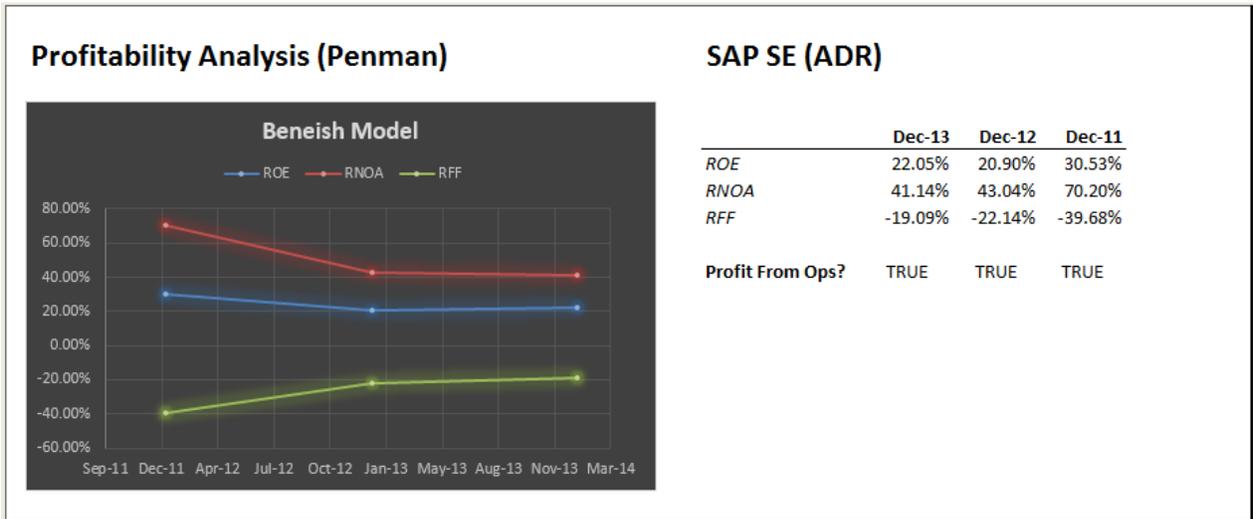
- a. This module receive the areas from each of the model modules to give formatting to the data sets. One of the areas is used to create a border line and another area is used to underline the titles

8) Module: Charts

- a. This module creates a graph from the data sets created for each model. The module receives the range where it's going to take the data from, the worksheet and the cell where you want the graph to be located at, the chart title, and the chart number in the worksheet (we need this number in particular because in the summary we have more than one chart). We also use a specific type of chart style.
- b. We create the chart associated with each analysis.

9) Summary

- a. Finally we concentrate all the information in the sheet "Summary" where you can easily identify if the company is profitable from their current operations, manipulates its financial statement or has a strong probability of going bankruptcy in the next 2 years.



Conceptual and learning difficulties encountered

During the coding of our project, we reinforced our knowledge in three main areas:

- Scope of variables and subs. We learned how to define public variables and subs, and how to use variables to pass data by value or by reference. We were able to create subs for repetitive tasks in separate modules.
- Extract data from the internet: We faced the difficulty of extracting inconsistent data, needing to cleanse the data, and troubleshoot the absence of data. We learned how to read better HTML documents and understand their structure, as well as using more functions of the “agent” given in class.
- Chart creation. This project was very useful for learning chart creation and formatting. We learned about chart positioning, sourcing, and styling. Managing charts existing in the same worksheet was key for the seamlessly operation of our program.

Assistance

Our team was integrated by Gustavo Lopez and Edgar Alatríste. We both create all of our code without any external assistance.