

The DuPont Method for Evaluating Company Profitability: The Case of Singapore Airlines During the Global Financial Crisis

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ABSTRACT

This paper discusses the application of the DuPont method to evaluate and profitability Singapore Airlines, Ltd. As a case example along with other Asia-Pacific airlines to illustrate the significant effects that the global financial crisis had on its profitability.

INTRODUCTION

At the beginning of my undergraduate Managerial Finance course, I present the DuPont method of evaluating a company's profitability. As discussed by Brigham and Houston (2013), Firer (1999), Gittman and Zutter (2012), Higgins (2016), Isberg (1998), Soliman (2006), and numerous others over the years, it is a well-known and effective way to evaluate a company's profit margin, asset turnover, financial leverage, return on assets (ROA), return on equity (ROE) and the interrelationships among them. After I introduce the DuPont equations with a simple example, I present Singapore Airlines, Ltd. as a case example to evaluate the determinants of a company's profitability, assess trends over time, compare with industry benchmarks, and illustrate the effects on company profitability of changes in the external environment.

The remainder of this paper discusses the DuPont method and the use the financial data of Singapore Airlines along with comparative financial data of other Asia-Pacific airlines to illustrate the its application as well as the significant effects that the global financial crisis had on company profitability – even airlines on the other side of the world.

BACKGROUND

The DuPont method, developed and used by DuPont Corporation in the 1920s, is quite useful for evaluating the determinants of a company's profitability, changes over time, and comparing its profitability with other companies. As shown below, a company's return on assets (ROA) is determined by its profit margin and asset turnover. Its ROE is in turn determined by its ROA and financial leverage.

$$ROA = \frac{Net\ Profit}{Sales} \times \frac{Sales}{Assets}$$

$$ROE = ROA \times \frac{Assets}{Equity}$$

$$(or) ROE = \frac{Net\ Profit}{Sales} \times \frac{Sales}{Assets} \times \frac{Assets}{Equity}$$

A company's profit margin measures how profitable a company is relative to sales. Asset turnover measures how efficiently a company utilizes (or manages) its assets. Financial leverage, often referred to as "equity multiplier," measures the extent to which it utilizes debt financing. A higher proportion of debt in a company's capital structure results in a higher assets/equity ratio.

It is possible for a company to have a high profit margin but a poor ROA if it is not managing its assets efficiently. This may occur, for example, because of low inventory turnover, slow receivables collection, or excess investment in fixed assets. A company can increase its ROA by increasing its profit margin and/or improving its asset management, such as collecting its receivable more quickly, better managing its inventory, or more efficiently utilizing its fixed assets. It should be noted however, that changes in one variable may affect one or more of the other variables in the DuPont equation. For example, tighter control of receivables may result in additional expenses as well as a decline in sales. Less inventory may also result in lost sales due to stock-outs. An increase in fixed assets to expand capacity, which initially reduces asset turnover, may ultimately increase a company's sales in the long run.

It is possible for a company to have a low ROA but a high ROE if it uses a high proportion of debt financing (financial leverage). However, a higher proportion of debt results in higher interest and principal payments which increases the financial risk of the company. This is the familiar trade-off between return and risk. Companies with highly stable cash flows may use high levels of debt financing which magnify ROE. Other companies with less stable cash flows may prefer to use less financial leverage.

If a company's ROE is unsatisfactory, the DuPont method is useful for identifying the underlying causes. It also helps identify why a company's ROE has increased (or declined) over time or why the company's ROE is higher (or lower) than another company's ROE.

It should be noted that comparisons of companies in different industries should be approached with caution. Companies in some industries, such as retail grocery, have low profit margins and high asset turnover. Companies in other industries, such as retail jewelry, have higher margins and lower asset turnover.

SINGAPORE AIRLINES, LTD. – A CASE EXAMPLE

Founded in 1947, Singapore Airlines, Ltd. (SIA) is the flagship airline of Singapore, a Southeast Asian island nation with a population of about 5.6 million located below the southern tip of the Malaysian peninsula, about one degree from the equator. A member of Star Alliance, along with United Airlines, Air Canada, Air China, Lufthansa, South African Airways, Swiss Air, Turkish Airlines, and 20 other airlines, Singapore Airlines flies to over 60 destinations in over 30 countries on five continents. Flying out of Singapore's ultramodern Changi Airport, Singapore Airlines ranks among the top airlines in the world for international passengers carried. Like its

Hong Kong-based competitor, Cathay Pacific, Singapore Airlines has no domestic flights. Both airlines rely entirely on international routes and operations.

I use Singapore Airlines as a case example to illustrate application of the DuPont method. The PowerPoint slides that I use are contained in the Appendix 1.

After introducing Singapore Airlines as a company (slides 1-2), I present its financial data using the DuPont framework for the fiscal year-ended (FYE) March 31, 2008 (slide 3). I ask students whether they think the company's ROE is high or low? Is its ROA high or low? What about its profit margin, asset turnover, and financial leverage? Some students are impressed with the company's profit margin of 12.83%, but most have difficulties answering these questions, since financial data must be evaluated relative to trends over time and appropriate (comparable) industry benchmarks.

I next present the company's historical results from 2004 to 2008 so that students can assess any trends over time (slide 4). The company's profit margin generally improved over the years although it declined to 12.83% from 14.69% in FYE 2007. The company's asset turnover also improved resulting in higher ROA's. Its financial leverage was remarkably stable, so the higher ROA's resulted in higher ROE's. There were slight declines in both its ROA and ROE in 2008.

After looking at the trends over time, I again ask the students to evaluate the company's profitability. They again have difficulty saying whether the numbers are good or bad in absolute terms. They need industry benchmarks for comparison. Accordingly, I next present slides 5 and 6 to show the extent of the company's global and regional operations and distribute a simple exercise (slides 7 and 8) that provides financial data of six other airlines in the Asia-Pacific region: Air China, Korean Air, Malaysian Airlines, Thai Airways, Qantas Airways, and Air New Zealand. In the exercise, they are asked which airline is the most profitable and why.

The results of the comparative analysis from the exercise are shown in slide 9. Singapore Airlines had the highest profit margin of 12.83% followed by Air China with 7.92% and Qantas with 6.20%. Although Malaysian Airline's profit margin of 5.82% was in the middle, its ROA of 8.46% was the highest. This was due to its noticeably higher asset turnover of 1.45. This underscores the role that asset management plays in determining a company's ROA.

Singapore Airlines had the lowest financial leverage, with an assets/equity ratio of 1.75. Malaysian Airlines' leverage was also relatively low (2.56). Nonetheless, Malaysian Airlines had the highest ROE of 21.63% due to its high ROA which offset its low leverage.

The highest financial leverage was that of Thai Airways. Thanks to its leverage, it was able to report a ROE of 6.45% with a ROA of only 1.56%

There is a noteworthy problem comparing the annual results of seven carriers in the region. As indicated in slide 9, the FYE's of their financial statements are different. Singapore Airlines' FYE is March 31. However, Air China, Korean Air, Malaysian Airlines and Thai Airways have December 31 FYE's. Qantas Airways and Air New Zealand, both based in the southern hemisphere, have June 31 FYE's. Different FYE's can be problematic when comparing companies, especially during rapidly changing external environments.

Indeed, one of the objectives of the exercise is to illustrate the effects on company profitability of changing external environments, specifically the 2007-08 financial crisis. The financial data provided in the exercise was intended to represent the companies' profitability in 2007, the year preceding the global recession. However, because of the different FYE's of the financial statements, as much as six months apart, it could not be done exactly. I tell students that this complication is one of many they will face in the real world.

After we discuss the results from the exercise, I present the comparative data for 2008 (slide 10), at least more or less 2008 given the different FYE's.

What a difference a year makes! The profitability of the airlines (or lack thereof) is dramatically different due to the recession resulting from the 2007-08 global financial crisis. Whereas financial leverage can magnify positive returns, it also magnifies negative returns. This is illustrated in this case example. The negative ROE's experienced by Air China, Korean Air and Thai Airways are particularly alarming. When presenting this data, I flip back and forth between slide 9 (2007) and slide 10 (2008) to highlight the before and after.

Relatively speaking, Singapore Airlines's profitability was respectable. Although its ROE declined from 13.55% to 7.62%, it still managed to earn the highest ROE of the group, which was followed by Malaysian Airlines with an ROE of 5.84%, down from 21.63%.

I conclude the case example by bringing the students up to date with the performance of Singapore Airlines (slide 11). The company has not regained its previous high profit margins. Its asset turnover has been stable, but its financial leverage, which was previously quite stable, slightly increased from 2014 to 2017. Its ROE in 2017 was only 2.76%. In recent years, the company has faced increasing competition from its Middle Eastern and Chinese rivals.

CONCLUDING NOTE

The exercise described in this paper could easily be extended by asking students to obtain financial data on other airlines such as American Airlines, Delta Air Lines, Southwest Airlines, and United Airlines in the United States or elsewhere such as Emirates Airline, Etihad Airways, Qatar Airways, and Oman Air in the Middle East or Air France-KLM, Ryanair, British Airways, Lufthansa, and Turkish Airlines in Europe.

At the end of the exercise, I point out that calculating the ratios is the easy part and only the starting point. The next step is to need look beneath the numbers to understand why they are changing and why one company's ratios are different than another's.

ENDNOTES

¹ My choice of Singapore Airlines, Ltd. dates back to the early 1990s when I was on the faculty of the National University of Singapore and taught the finance module of Singapore Airlines' two-week Middle Management Programme held in various locations in Southeast Asia for managers throughout the company's global operations. The case example described in this paper was part of the module I taught. Over the years, including the Asian Financial Crisis in 1997 and the 9/11 terrorist attack on 2001, I have updated it for use in my Managerial Finance course and other executive programs.

² The financial data of Singapore Airlines, Qantas and Air New Zealand could be synchronized and made more comparable with the December 31 FYE's of Air China, Korean Air, Malaysian Airlines and Thai Airways using quarterly financial statements. This would be an interesting extension of the exercise.

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**APPENDIX 1
POWERPOINT SLIDES**

***A Case Example:
Singapore Airlines, Ltd.***

1



2



Singapore Airlines, Ltd.

<i>Year Ended March 31</i>	Margin X	Turnover =	ROA X	Leverage =	ROE
2008	12.83%	0.60	7.73%	1.75	13.55%

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Singapore Airlines, Ltd.

<i>Year Ended March 31</i>	Margin X	Turnover =	ROA X	Leverage =	ROE
2008	12.83%	0.60	7.73%	1.75	13.55%
2007	14.69%	0.56	8.19%	1.72	14.10%
2006	9.30%	0.57	5.31%	1.74	9.21%
2005	11.26%	0.55	6.22%	1.76	10.96%
2004	7.68%	0.49	3.77%	1.75	6.60%

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SINGAPORE AIRLINES

Click a region to view route

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SINGAPORE AIRLINES

North & South East Asia

Beijing, Seoul, Osaka Nagoya, Tokyo, Nanjing, Fukuoka, Shanghai, Taipei, Singapore, Bangkok, Hanoi, Ho Chi Minh City, Kuala Lumpur, Penang, Jakarta, Denpasar (Bali)

Back to main map

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Comparative Profitability Analysis

- Singapore Airlines
- Air China
- Korean Air
- Malaysian Airlines
- Thai Airways
- Quantas Airways
- Air New Zealand

Which airline is the most profitable? Why?

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	Singapore Airlines	Air China	Korean Air	Malaysia Airlines	Thai Airways	Quantas Airways	Air New Zealand
	3/31/08	12/31/07	12/31/07	12/31/07	12/31/07	6/30/08	6/30/08
	(SGD)	(CNY)	(KRW)	(MYR)	(THB)	(AUD)	(NZD)
Income Statement (millions)							
Revenue	15,973	51,082	8,811,989	14,030	199,921	15,627	4,667
Net profit	2,049	4,046	12,893	851	4,368	969	218
Balance Sheet (millions)							
Current assets	8,313	9,831	1,981,953	7,095	65,229	5,616	2,112
Property, plant & eEquipment	16,474	61,692	10,869,686	2,061	207,153	12,341	2,534
Other assets	1,728	19,777	2,292,065	906	7,893	1,743	377
Total Assets	26,515	91,300	15,143,704	10,062	280,275	19,700	5,023
Current Liabilities	5,868	27,106	3,647,746	5,256	97,551	7,604	1,707
Long-term debt & other	5,522	33,580	7,095,936	871	114,974	6,365	1,739
Total liabilities	11,390	60,686	10,743,682	6,127	212,525	13,969	3,446
Stockholders' equity	15,125	30,614	4,400,022	3,935	67,750	5,731	1,577
Total liabilities & equity	26,515	91,300	15,143,704	10,062	280,275	19,700	5,023
Profit margin	12.83%						
Asset turnover	0.60						
ROA	7.73%						
Financial leverage	1.75						
ROE	13.55%						

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	FYE	Margin	X	Turnover	=	ROA	X	Leverage	=	ROE
Singapore Airlines	3/31/08	12.83%		0.60		7.73%		1.75		13.55%
Air China	12/31/07	7.92%		0.56		4.43%		2.98		13.22%
Korean Air	12/31/07	0.15%		0.58		0.09%		3.44		0.29%
Malaysian Airlines	12/31/07	5.82%		1.45		8.46%		2.56		21.63%
Thai Airways	12/31/07	2.18%		0.71		1.56%		4.14		6.45%
Qantas Airways	6/30/08	6.20%		0.79		4.92%		3.44		16.91%
Air New Zealand	6/30/08	4.67%		0.93		4.34%		3.19		13.82%

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A year later . . .

	FYE	Margin	X	Turnover	=	ROA	X	Leverage	=	ROE
Singapore Airlines	3/31/09	6.64%		0.64		4.28%		1.78		7.62%
Air China	12/31/08	(17.49%)		0.53		(9.22%)		5.03		(46.41%)
Korean Air	12/31/08	(19.02%)		0.64		(12.24%)		5.62		(68.80%)
Malaysian Airlines	12/31/08	1.62%		1.49		2.43%		2.41		5.84%
Thai Airways	12/31/08	(10.55%)		0.78		(8.24%)		5.69		(46.88%)
Qantas Airways	6/30/09	0.80%		0.73		0.58%		3.50		2.05%
Air New Zealand	6/30/09	0.46%		0.91		0.42%		3.14		1.31%

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Singapore Airlines, Ltd.

Year Ended March 31	Margin	X	Turnover = ROA	X	Leverage = ROE		
2017	2.42%		0.60		1.46%	1.89	2.76%
2016	5.28%		0.64		3.39%	1.86	6.31%
2015	2.36%		0.65		1.54%	1.92	2.95%
2014	2.36%		0.67		1.59%	1.71	2.72%
2013	2.51%		0.67		1.69%	1.71	2.89%
2012	2.26%		0.67		1.52%	1.71	2.61%
2011	7.52%		0.59		4.45%	1.73	7.69%
2010	1.70%		0.57		0.96%	1.67	1.60%
2009	6.64%		0.64		4.28%	1.78	7.62%
2008	12.83%		0.60		7.73%	1.75	13.55%
2007	14.69%		0.56		8.19%	1.72	14.10%
2006	9.30%		0.57		5.31%	1.74	9.21%
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2004	7.68%		0.49		3.77%	1.75	6.60%

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