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## Competition and profits in the airline industry: the case of AirAsia and Malaysia Airlines

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**Abstract:** This case study examines the revenue and profitability of two competing airline companies – AirAsia (a low-cost carrier) and Malaysia Airlines (a legacy carrier) – over the period 2001 to 2013. After AirAsia entered the market, the revenue passenger kilometre and available seat kilometre of Malaysia Airlines declined in the mid-period (2005–2009). AirAsia had an increasing trend of revenue passenger kilometre and available seat kilometre over time, suggesting the successful strategy of a low-cost carrier. AirAsia had higher return on equity and return on assets than Malaysia Airlines. However, it had lower revenue per available seat kilometre than Malaysia Airlines, probably due to lower fares. The findings indicate that the financial and operating performance of the legacy carrier, Malaysia Airlines was affected by the entry of a low-cost carrier, AirAsia.

**Keywords:** competition; revenues; profits; airline industry; legacy carrier; low-cost carrier; management strategy.

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## 1 Introduction

This case study examines the revenue and profitability of two competing airline companies – AirAsia and Malaysia Airlines – over the period 2001 to 2013. Malaysia Airlines, the legacy carrier, started commercial operations in 1947 as Malayan Airways Limited. In 1971, the Malaysia and Singapore Governments agreed to setup separate airlines and the name was changed to Malaysian Airline System (MAS). In 1987, the name was changed to Malaysia Airlines retaining the MAS acronym. MAS's vision is to be a Five Star Value Carrier, connecting Malaysia and the world (Malaysia Airlines, 2008). MAS's website on 18 January 2019 shows that MAS is 100% owned by Malaysia Aviation Group which is 100% owned by Khazanah Malaysia (Treasury) (<https://www.malaysiaairlines.com/us/en/about-us.html>). In contrast, AirAsia's goal is to establish itself as a leading low-cost carrier in Asia (AirAsia, 2005). Its customer focus is to stimulate demand by offering the lowest fares, develop a comprehensive distribution channel, develop various products and services while maintaining simplicity, and providing a unique AirAsia experience. The objective of this paper is to compare and contrast revenue, profitability and operating performance between two airlines with competing management strategies: a legacy carrier versus a low-cost carrier. These two airlines make a compelling case study to study their operating performance because of their contrasting fortunes. MAS, the legacy carrier, struggled financially. In August 2014, MAS was nationalised by Khazanah Malaysia and delisted from Malaysia's Stock Exchange. In contrast, AirAsia started as a low-cost carrier but has been named the world's best low-cost carrier for ten years successive years (<https://www.worldairlineawards.com/worlds-best-low-cost-airlines-2018/>). On 22 November 2004, AirAsia was listed on the main board of Malaysia's Stock Exchange.

In 2000, Malaysia Airlines said that it was losing money because it was subsidising domestic routes. At that time, the Malaysian Government was proposing deregulating the airlines industry to allow other local airline companies to fly domestic routes (Fernandez, 2000). The national carrier had monopolised the domestic sector. It flew 118 routes, of which only four were profitable (Ho, 2006). Malaysia Airlines had 111 aircraft, flew 20

million passengers a year, half of which were on domestic routes. The national carrier reported a 1.3 billion Malaysian Ringgit (MYR) loss for the nine-month period ended December 2005 due to high fuel cost and mismanagement.

In 2001, Mr. Tony Fernandes assembled an investment team to take over an unprofitable AirAsia. Privately-owned Tune Air took over AirAsia from DRB-HICOM Berhad for a nominal MYR1 in 2001. As part of the deal, it also assumed 50% of the airline's US\$140 million (US\$1 = MYR3.80) debt (Eirmalasare, 2002). In January 2002, AirAsia was re-launched with three aircraft with airfares costing half of those of Malaysia Airlines. The company posted its first profits just seven months after the launch.

Mr. Tony Fernandes opined that Malaysia Airlines' loads had not been affected with the arrival of AirAsia, which had stimulated a new market with a lot of people who have never thought of flying before. Advised by Connor McCarthy, the former operations director at Ryanair, AirAsia had achieved the lowest costs in the industry. It spent only 2.8 US cents to fly one passenger one kilometre, against 4.8 cents for Ryanair in Europe and 5.8 cents for Southwest Airlines in the USA, according to the Sydney-based Centre for Asia Pacific Aviation (Burton, 2003).

By 2005, AirAsia had a fleet of 22 aircraft operating more than 100 flights a day. The company was listed on the Malaysian Stock Exchange in 2004. In 2004, the company reported revenue of MYR103 million, pre-tax earnings of MYR16 million, with 3.2 million passengers, and expected pre-tax earnings of MYR48 million with 6 million passengers in 2005 (Air Transport World, 2005). In 2011, AirAsia heralded the arrival of its 100th Airbus A320 and another 275 had been ordered through 2026. AirAsia's passenger numbers have grown from 200,000 in its first year of operation to an estimated 31 million in 2011. Jet fuel prices were estimated to rise by 13–14% to US\$125 per barrel for 2011 and US\$130 a barrel for 2012–2013, but AirAsia together with Singapore Airlines were the two least affected because of their strong profitability and the relatively small slice that fuel costs take out of revenue (Jayasankaran, 2012). AirAsia is not interested in business class or first class services and is modelled after successful low-fare airlines like America's Southwest Airlines and Britain's RyanAir (Eirmalasare, 2002). Its key strategy is low fare with no frills such as meals, frequent flier miles or airport lounges. AirAsia's cost optimisation philosophy is through operating a faster turnaround time, improved aircraft utilisation and greater crew efficiency. They also built a low cost terminal to centralise their operations to reduce expenses and improve efficiency, and leveraging on technology for internet booking and ticketless service (AirAsia, 2005).

In this paper, we examine and compare the trends in revenue, profitability and operating performance of AirAsia and Malaysia Airlines over a 13-year period. We examine whether the entry of a low-cost carrier, AirAsia affected the performance of the legacy carrier, Malaysia Airlines. After AirAsia entered the market, the revenue passenger kilometre (RPK) and available seat kilometre (ASK) of MAS declined in the mid-period (2005–2009). AirAsia had an increasing trend of RPK and ASK over time, suggesting the successful strategy of a low-cost carrier. On average, revenue per available seat kilometre (RevPASK) of MAS was higher than that of AirAsia; this may be due to AirAsia's airfares being half of those of MAS. The findings indicate that AirAsia has higher profitability [return on equity (ROE) and return on assets (ROAs)] but lower RevPASK than MAS. RevPASK in the mid and later periods are higher than the early period because the number of passengers travelling by air increased over time. In

summary, this paper contributes to an understanding that the low-cost carrier strategy helped AirAsia achieve higher profitability than the legacy carrier MAS during the sample period, and may have impacted the RPK and ASK of MAS.

The remainder of the paper is organised as follows. Section 2 provides some background information about both airlines, a brief review of related literature and the methodology for the paper. Section 3 describes the data and presents the results. Finally, Section 4 concludes the paper.

## **2 Background and methodology**

MAS operates flights from Kuala Lumpur International Airport (KLIA) with destinations throughout Asia, Oceania and Europe. Its route structure is similar to a hub-spoke provider with international and domestic flights going through KLIA [see for example Malaysia Airlines, (2013), p.24]. In 2013, domestic revenue was MYR1,906.7 million (20%) and international revenue was MYR7,492.7 million (80%) of total revenue. The number of destinations served by AirAsia grew from six in 2001 to 52 in 2005 to 83 in 2013. In 2005, AirAsia had over 100 daily flights in eight countries and four hubs (Kuala Lumpur in Malaysia, Johor Bahru in Malaysia, Bangkok in Thailand and Jakarta in Indonesia). Its route structure is similar to a hub-spoke provider with four hubs [see AirAsia, (2005), p.30]. In 2013, AirAsia flew to 17 countries and had 16 hubs, and was the fifth largest airline in Asia in terms of number of passengers carried. The 2013 annual report states that AirAsia had 45% of the market share in Malaysia, 20% of the market share in Indonesia, 17% of the market share in Thailand and 12% of the market share in the Philippines.

Raza (2015) examines differentiated fare pricing in the airlines industry. He notes that airlines utilise differentiated fare pricing as one of the widely used revenue management tool by segmenting the cabin capacity into multiple fare classes. In perfect market segmentation, there is no demand leakage between the market segments, and customers do not cannibalise (move) between market segments. However, market segmentation is seldom perfect. Sun (2017) investigates the effects of deregulation in the Korean airline industry in the period 2006–2010. The expansion of low-cost carriers accounted for a substantial proportion of the two legacy carriers' (Korean Air and Asiana Airlines) profit reductions. Tan (2018) determines that legacy carriers allocate a larger share of their operations to an independent regional airline partner on routes that experience stronger competition, particularly from low-cost carriers. Legacy carriers' airfares are lower on competitive routes that they outsource. Carida and Bonizio (2018) identify the main differences in the operating revenue and expense management of two low-cost airline companies: Gol (Gol Linhas Aéreas Inteligentes S.A.), a Brazilian airline, and Ryanair (Ryanair Holdings plc), an Irish airline. From 2012 to 2016, Gol suffered operating losses but Ryanair reported recurring profits and high occupancy rates. The results show that Gol operating expenses per seat/km are higher than Ryanair resulting in operating loss.

Our paper is similar to Sun (2017) in that we examine a low-cost carrier and a legacy carrier. We extend research in Sun (2017) to examine revenue, profitability and operating measures between the two airlines. We use methodology similar to Enz et al. (2016) who examine revenue performance in the hotel industry. They report that European hotels that positioned at higher daily rates achieved higher revenue per available room than

competitors but experienced lower comparative occupancies. We obtain a similar revenue measure – RevPASK – for the airlines. We analyse RevPASK over the period that AirAsia overlapped with Malaysia Airlines: the early period (2001–2004), mid-period (2005–2008), and later period (2009–2013).

Other financial performance measures include: revenue, earnings before interest and tax (EBIT), operating cash flows, total assets, and total shareholders' equity. Our profitability measures are: ROAs (EBIT divided by average total assets) and ROE (EBIT divided by average total shareholders' equity). Our performance measures include: passengers carried, RPK, ASK, load factor, distance flown, number of employees, and revenue per employee.

### 2.1 *ROE and ROA decomposition*

We perform DuPont Analysis to examine whether firms' financial performances are driven by operating margin, asset turnover, or financial leverage (Carida and Bonizio, 2018). Carida and Bonizio (2018) decompose return on investment (ROI) into operating margin and capital turnover. The ROI indicates the returns from operating activities for each investment unit. Following the concept in Carida and Bonizio (2018), we decompose ROE into ROAs and financial leverage (average total assets divided by average total shareholders' equity) and further decompose ROA into operating margin (EBIT divided by sales) and asset turnover (sales divided by average total assets). We measure ROE and ROA using EBIT because we would like to measure the returns the company generates from its operating activities before interest and tax effects.

$$\begin{aligned} ROA &= \text{operating margin} \times \text{asset turnover} \\ &= (\text{earnings before interest and tax} / \text{sales}) \times (\text{sales} / \text{average total assets}) \end{aligned}$$

$$\begin{aligned} ROE &= ROA \times \text{financial leverage} \\ &= ROA \times (\text{average total assets} / \text{average total shareholders' equity}) \end{aligned}$$

The ROE decomposition is consistent with the view of efficiency and effectiveness. Operating margin measures efficiency – a firm's ability to achieve profit at a given sales level. Asset turnover is a measure of effectiveness – a firm's ability to utilise assets to achieve highest revenues. Financial leverage represents the risk to the shareholders that is caused by the degree to which a firm uses debt in its capital structure. If a firm cannot use debt to generate higher return than the cost of debt, an increase in an interest expense will reduce net income. Hence, firms having more debt could have lower ROE than those not using debt.

### 2.2 *Regression analysis*

In addition, we perform regression analyses to investigate the effect of *RevPASK* on financial measures (i.e., *ROE* and *ROA*), controlling for other operating performance measures and time periods. We also examine whether AirAsia and MAS have different *RevPASK*. The regression models are shown as follows:

$$\begin{aligned} ROE &= \beta_0 + \beta_1 \text{AirAsia} + \beta_2 \text{RevPASK} + \beta_3 \text{AirAsia} \times \text{RevPASK} \\ &+ \beta_4 \text{Log\_PG} + \beta_5 \text{MID} + \beta_6 \text{LATER} + \varepsilon \end{aligned} \quad (1)$$

$$ROA = \beta_0 + \beta_1 AirAsia + \beta_2 RevPASK + \beta_3 AirAsia \times RevPASK + \beta_4 Log\_PG + \beta_5 MID + \beta_6 LATER + \varepsilon \quad (2)$$

Next, we examine whether AirAsia and MAS have different *RevPASK* over time periods. The regression model is presented as follow:

$$RevPASK = \beta_0 + \beta_1 AirAsia + \beta_2 MID + \beta_3 LATER + \beta_4 AirAsia \times MID + \beta_5 AirAsia \times LATER + \varepsilon \quad (3)$$

where *ROE* is return on equity, calculated by EBIT divided by average total shareholders' equity; *ROA* is return on assets calculated by EBIT divided by average total assets; *AirAsia* is a dummy variable that equals one if airline is AirAsia, and zero otherwise; *RevPASK* is revenue per available seat kilometre; *Log\_PG* is the log of passengers carried; *MID* is a dummy variable that equals one if the period is 2005–2008, and zero otherwise; *LATER* is a dummy variable that equals one if the period is 2009–2013, and zero otherwise.

### 3 Data and analysis

We obtain data from two sources: financial data from Compustat Global (2001–2013) and other data hand-collected from annual reports of the airlines. Our analysis period is up to year 2013 as data for MAS is not available after that. MAS is now 100% owned by the Treasury of Malaysia, and we do not find public financial data on MAS. First, we analyse the financial performance and operating performance of AirAsia and MAS over time. Second, we perform DuPont analysis to investigate the drivers of ROE and ROA. Finally, we perform regression analysis to examine the association between financial measures and operating measures and the extent to which the performances of AirAsia and MAS are different over the period of 2001–2013.

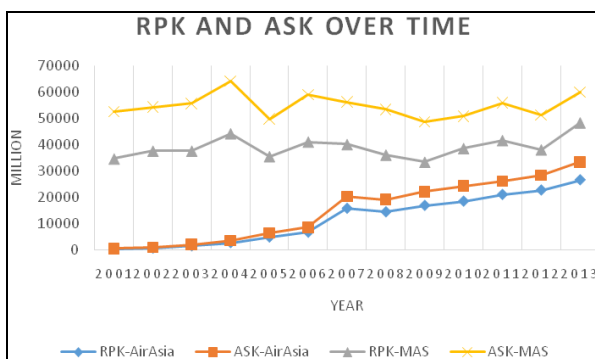
#### 3.1 Results

Figure 1 shows the trend of RPK and ASK over 2001–2013. RPK and ASK move in the same direction. The legacy carrier (MAS) enjoyed higher RPK and ASK than the low-cost carrier (AirAsia) over the period 2001–2013, but the gap between these two airlines has reduced over time. After AirAsia entered the market, the market share of MAS was affected as can be seen from the decrease of RPK and ASK in the mid-period (2005–2009). We notice that AirAsia had an increasing trend of RPK and ASK over time, suggesting the successful strategy of a low-cost carrier.

Figure 2 presents the trend of *RevPASK* over 2001–2013. AirAsia had higher *RevPASK* than MAS in the early period. However, AirAsia's *RevPASK* declined from 0.29 in 2001 to the lowest value (0.10) in 2005–2006, but rebounded to 0.17 in 2011–2012. MAS's *RevPASK* was at 0.16 in the early period, which was lower than that of AirAsia. However, in the mid-period, MAS's *RevPASK* increased from 0.15 in 2003 to 0.28 in 2008. MAS's *RevPASK* decreased to 0.23 in 2009 and fluctuated in the later period, but was still higher than that of AirAsia's. AirAsia's airfares cost half of those of MAS. Example, searches on the airlines' websites on 18 January 2019 show that return flights from Kuala Lumpur, Malaysia to Kota Kinabalu, Malaysia on 16 February 2019

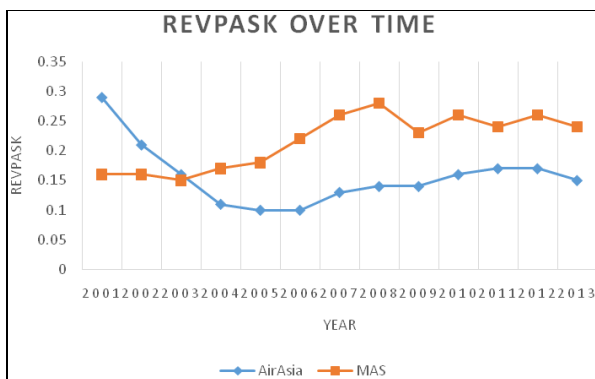
cost MYR347 by MAS and MYR173 by AirAsia, respectively. This indicates that, on average, a legacy carrier has better revenue generating performance (RevPASK) than a low-cost carrier.

**Figure 1** RPK and ASK trends over 2001–2013 (see online version for colours)



Note: MAS is Malaysia Airlines.

**Figure 2** RevPASK trend over 2001–2013 (see online version for colours)



Note: MAS is Malaysia Airlines.

Table 1, panel A presents descriptive statistics of the financial performance. The results show that MAS was significantly larger in size than AirAsia in terms of revenue. The mean value of revenue was MYR11,855 (MYR2,155) million for MAS (AirAsia) and the difference is statistically significant ( $t\text{-stat} = -11.42$ ). The mean values of total assets were MYR10,809 million and MYR7,000 million for MAS and AirAsia, respectively, but not statistically significant. The legacy carrier achieved higher revenue than the low-cost carrier. However, AirAsia had significantly lower operating cost ( $t\text{-stat} = -12.89$ ), but higher EBIT ( $t\text{-stat} = 3.32$ ),

ROA (t-stat = 3.86), and ROE (t-stat = 3.89) than MAS. The mean values of *EBIT*, *ROA*, and *ROE* of AirAsia were positive, while those of MAS were negative and the difference is statistically significant. AirAsia, a low-cost carrier, achieved the lowest costs in the industry (Burton, 2003) and was more profitable than MAS. This is consistent with Ong and Tan (2010) that AirAsia is very profitable and fast-growing. In addition, AirAsia had significantly lower financial leverage ratio (t-stat = -1.92) than MAS. AirAsia's average rate of financing for non-current borrowings in 2013 ranged from 4.21% for term loans to 5.68% for finance lease liabilities [AirAsia, (2013), p.225]. MAS' rate of financing in 2013 was 3.55–5.65% for term loans and 3.00–4.90% for finance leases [Malaysia Airlines, (2013), p.131]. Financing costs for both airlines are fairly similar, with MAS having lower rate for finance leases compared to AirAsia.

Table 1, panels B and C report the financial performance of AirAsia and MAS by year, respectively. In panel B, AirAsia had an increasing trend in revenue, total assets, and total shareholders' equity over 2001–2013. AirAsia's revenues (operating costs) had grown from MYR168 million (MYR182 million) in 2001 to MYR5,112 million (MYR4,219 million) in 2013. In 2010, the company reached the highest EBIT (MYR1,105 million) and CFO (MYR1,619 million). The EBIT and operating cash flow of AirAsia were the highest in the later period (2009–2013), followed by the mid-period (2005–2008), and the early period (2001–2004). AirAsia had the highest ROA (26%) and ROE (61%) in 2004 when the company was listed on the Malaysian Stock Exchange. The price-to-earnings ratio of AirAsia was 30.94 at that time and increased to 39.47 in 2005. It reflected the investors' expectation for the growth in stock price of AirAsia. However, the price-to-earnings ratio declined in the mid-period and recovered in 2011. The financial leverage ratio was 1.34 in 2005 when AirAsia entered the stock market. AirAsia's financial leverage increased over time until it reached the highest (4.95) in 2009 and declined in the later period. ROA and ROE declined in the mid-period (2005–2007). Although AirAsia's ROA and ROE increased again in 2009, it still had a declining trend in the later period (2010–2013). In sum, the profitability of AirAsia was lower in the mid and later periods than in the early period, but still higher than that of MAS's.

In Table 1, panel C, MAS's total assets were substantially higher than AirAsia's in the early period. MAS's total assets drastically declined in 2003 and fluctuated in the period 2004–2013. Revenues in the mid-period were higher than in the early period, but MAS was unable to increase more revenues in the later period. Although MAS had higher RevPASK than AirAsia in the mid and later periods (see Figure 1), its profitability and cash flow remained lower than AirAsia's. MAS, a legacy carrier, had negative EBIT, operating cash flow, ROA, and ROE in the mid and later periods. Its operating costs increased over time and were higher than revenues in the mid and later period. The price-to-earnings ratios of MAS were at 15 in 2004 and 2005 when AirAsia entered the stock market, suggesting that investors had lower expectation on its growth than AirAsia's. The price-to-earnings ratios of MAS were negative in 2006 and in the later period when the company had worse financial performance. MAS's financial leverage ratios were approximately similar to AirAsia's, except for the later period. The financial leverage ratio of MAS grew to 9.41 in 2012, indicating that its major source of fund was from financing during the period of poor financial performance.



Table 1 Financial performance

Variable (MYR million)	AirAsia			Malaysia Airlines			Mean difference between AirAsia and MAS	t-stat		
	Mean	SD	Min	Max	Mean	SD			Min	Max
Revenue	2,115	1,878	168	5,112	11,855	2,528	8,378	15,035	(9,740)	-11.42***
Operating cost	1,679	1,450	182	4,219	12,251	2,606	8,426	15,864	(10,573)	-12.89***
EBIT	436	448	(15)	1,105	(396)	795	(2,210)	561	832	3.32***
CFO	491	637	(416)	1,619	133	1,077	(1,578)	2,371	358	1.04
Asset	7,000	6,645	49	17,856	10,809	4,842	5,718	21,855	(3,808)	-1.71
Equity	2,048	1,948	(105)	5,902	2,616	1,221	736	4,295	(568)	-0.90
ROA (%)	8%	7%	(3%)	26%	(4%)	9%	(20%)	7%	12%	3.86***
ROE (%)	25%	16%	3%	61%	(17%)	34%	(97%)	18%	42%	3.89***
Financial Leverage	2.81	1.50	(0.98)	4.95	4.23	2.18	2.19	9.41	(1.42)	-1.92***
PE	13.29	13.39	-4.11	39.47	3.51	17.52	-42.94	28.83	9.78	1.46

Notes: Variable definitions: Revenue is sales; operating cost is revenue minus EBIT; EBIT is earnings before interest and tax; CFO is operating cash flow; asset is total assets; equity is total shareholders' equity; ROA is EBIT divided by average total assets; and ROE is EBIT divided by average total shareholders' equity; financial leverage is average total assets divided by average total shareholders' equity; and PE is closing price at the end of fiscal year divided by earnings per share.

\*\*\*Indicates statistical significance at 1% level.

**Table 1** Financial performance (continued)

<i>Fiscal year</i>	<i>Revenue</i>	<i>Operating cost</i>	<i>EBIT</i>	<i>CFO</i>	<i>Asset</i>	<i>Equity</i>	<i>ROA (%)</i>	<i>ROE (%)</i>	<i>Financial leverage</i>	<i>PE</i>
30-Jun-01	168	182	(15)	(3)	49	(105)	-	-	-	n.a.
30-Jun-02	217	219	(1)	(12)	51	3	-3%	3%	-0.98	n.a.
30-Jun-03	330	319	12	15	124	49	13%	45%	3.41	n.a.
30-Jun-04	393	332	61	29	350	150	26%	61%	2.38	n.a.
30-Jun-05	666	541	125	(0)	1,123	953	17%	23%	1.34	30.94
30-Jun-06	863	773	90	282	2,413	1,053	5%	9%	1.76	39.47
30-Jun-07	1,603	1,392	211	595	4,779	1,662	6%	16%	2.65	8.98
31-Dec-07*	1,094	866	228	256	6,448	2,099	4%	12%	2.99	4.43
31-Dec-08	2,635	2,186	448	(416)	9,521	1,606	6%	24%	4.31	-4.11
31-Dec-09	3,133	2,286	847	784	11,398	2,621	8%	40%	4.95	6.70
31-Dec-10	3,948	2,843	1,105	1,619	13,240	3,641	9%	35%	3.93	6.58
31-Dec-11	4,495	3,499	996	1,404	13,906	4,036	7%	26%	3.54	18.85
31-Dec-12	4,946	3,842	1,104	1,355	16,745	5,902	7%	22%	3.08	4.16
31-Dec-13	5,112	4,219	893	961	17,856	5,001	5%	16%	3.17	16.90

*Notes: Variable definitions: Revenue is sales; operating cost is revenue minus EBIT; EBIT is earnings before interest and tax; CFO is operating cash flow; asset is total assets; equity is total shareholders' equity; ROA is EBIT divided by average total assets; and ROE is EBIT divided by average total shareholders' equity; financial leverage is average total assets divided by average total shareholders' equity; and PE is closing price at the end of fiscal year divided by earnings per share.*

\*AirAsia changed fiscal year from June to December in 2007.

\*\*Malaysia Airlines changed fiscal year from March to December in 2005.

**Table 1** Financial performance (continued)

<i>Panel C: Financial performance of Malaysia Airlines by year (MYR million)</i>										
<i>Fiscal year</i>	<i>Revenue</i>	<i>Operating cost</i>	<i>EBIT</i>	<i>CFO</i>	<i>Asset</i>	<i>Equity</i>	<i>ROA (%)</i>	<i>ROE (%)</i>	<i>Financial leverage</i>	<i>PE</i>
31-Mar-02	8,378	9,144	(766)	1,148	14,754	1,215	-	-	-	-3.43
31-Mar-03	8,675	8,426	249	1,073	5,718	2,615	2%	13%	5.35	8.53
31-Mar-04	8,588	8,557	31	1,151	6,616	3,024	1%	1%	2.19	14.95
31-Mar-05	10,951	10,671	280	581	7,395	3,319	4%	9%	2.21	14.60
31-Dec-05**	8,851	10,219	(1,369)	(555)	6,330	2,023	-20%	-51%	2.57	-2.81
31-Dec-06	13,172	13,999	(827)	(147)	6,971	1,873	-12%	-42%	3.41	-42.94
31-Dec-07	14,686	14,125	561	2,371	10,054	4,295	7%	18%	2.76	8.41
31-Dec-08	15,035	14,732	303	(624)	10,072	4,186	3%	7%	2.37	20.93
31-Dec-09	11,310	11,938	(628)	(1,578)	8,528	736	-7%	-26%	3.78	9.27
31-Dec-10	12,980	12,717	264	66	12,432	3,524	3%	12%	4.92	28.83
31-Dec-11	13,654	15,864	(2,210)	(597)	12,499	1,043	-18%	-97%	5.46	-1.72
31-Dec-12	13,287	13,648	(361)	(305)	17,291	2,123	-2%	-23%	9.41	-5.49
31-Dec-13	14,548	15,228	(680)	(860)	21,855	4,034	-3%	-22%	6.36	-3.57

Notes: *Variable definitions:* Revenue is sales; *operating cost* is revenue minus EBIT; *EBIT* is earnings before interest and tax; *CFO* is operating cash flow; *asset* is total assets; *equity* is total shareholders' equity; *ROA* is EBIT divided by average total assets; and *ROE* is EBIT divided by average total shareholders' equity; *financial leverage* is average total assets divided by average total shareholders' equity; and *PE* is closing price at the end of fiscal year divided by earnings per share.

\* AirAsia changed fiscal year from June to December in 2007.

\*\* Malaysia Airlines changed fiscal year from March to December in 2005.

Table 2 provides operating performance data of the two airlines over time. In panel A, descriptive statistics show that AirAsia had significantly lower passengers carried (t-stat = -3.14), RPK (t-stat = -10.61), ASK (t-stat = -12.53), distance flown (t-stat = -9.32), and number of employees (t-stat = -26.95) than MAS. However, AirAsia had significantly higher load factor than MAS (t-stat = 2.26). Panel B shows that AirAsia had an increasing trend in operating performance (i.e., passengers carried, RPK, ASK, load factor, distance flown, and number of employees) over the three periods. However, revenue per employee dropped in 2004 because the number of employees doubled in that year. In panel C, MAS's operating performances (i.e., passengers carried, RPK, ASK, load factor, distance flown, and number of employees) fluctuated over the three periods. The number of passengers carried was higher than AirAsia's in 2001–2010, but it declined over time. The number of passengers carried of MAS was the highest at 20.7 million passengers in 2009, but decreased to 13.9 million passengers in 2013. However, AirAsia's number of passengers carried increased from 14.3 million in 2009 to 21.9 million passengers in 2013. In 2013, AirAsia was the fifth largest airline in Asia in terms of passengers and had the lowest cost (AirAsia, 2014). These findings suggest that passengers preferred flying with AirAsia to MAS because AirAsia's airfares were half of those of MAS. AirAsia's fares were more affordable because the cost per ASK dropped by an impressive 6% from 13.8 sen in 2012 to 13.0 sen in 2013 (AirAsia, 2014). This has been achieved by various processes implemented over the past 12 years, including the cost out avoidance program launched in 2012, which targets both ground and flight-related operations. The program involved using the latest technologies to increase operational efficiencies by optimising crew and aircraft utilisation to further enhance on-time performance (AirAsia, 2014). Moreover, the distance flown by AirAsia rose from 4.4 million kilometres in 2001 to 173.6 million kilometres in 2013. On average, AirAsia had a higher load factor than MAS over the three periods and higher revenue per employee than MAS's in the early and later periods. Malaysia Airlines tried to implement many initiatives to fill seats, to manage costs, and to protect market share in a growing market. For example, in 2013, it opened new routes, maximised revenue through aggressive volume push, drove productivity improvements and efficiency in operations (Malaysia Airlines, 2013). Hence, its RPK, ASK, load factor, and revenue per employee increased in 2013 when compared to 2012.

Table 3 reports Pearson correlation statistics. Revenue has a negative correlation with EBIT, ROA, and ROE, but a positive correlation with passengers carried (*PG\_Carried*), ASK, RPK, distance flown (*distance*), number of employees (*Emp*), *RevPASK* and financial leverage (*Lev*). The financial performance measures (i.e., EBIT, CFO, ROA, and ROE) are positively correlated with each other, but are negatively correlated with operating performance measures (i.e., *PG\_Carried*, ASK, RPK, *distance*, and *Emp*). The *PG\_Carried*, ASK, RPK, *distance*, and *Emp* are positively correlated with each other. *RevPASK* is negatively correlated with EBIT, ROA, ROE, and load factor (*LoadF*), but positively correlated with *PG\_Carried*, ASK, RPK, *distance*, *Emp* and *Lev*.

**Table 2** Operating performance

Variable	AirAsia				Malaysia Airlines				Mean difference	t-test
	Mean	SD	Min	Max	Mean	SD	Min	Max		
	Passengers carried (000)	9,352	7,496	291	21,853	15,867	1,922	13,760		
RPK (MYR million)	10,923	8,964	363	26,607	39,039	4,083	33,455	48,323	-28,116	-10.61***
ASK (MYR million)	14,025	11,276	586	33,401	54,738	4,392	48,762	64,115	-40,713	-12.53***
Load factor	75	5	62	80	71	4	66	81	4	2.26**
Distance flown	79,332	59,776	4,440	173,555	237,244	20,429	201,189	265,050	-157,912	-9.32***
Number of employees (000 km)	3,086	1,996	241	6,089	20,478	1,309	19,094	22,835	-17,392	-26.95***
Revenue per employee	0.61	0.22	0.28	0.88	0.59	0.15	0.39	0.79	0.02	0.34

Notes: *Variable definitions*: ASK is available seat kilometres; RPK is revenue passenger kilometres.  
 \*\*, \*\*\*Indicate statistical significance at 5% and 1% levels, respectively.

**Table 2** Operating performance (continued)

Panel B: AirAsia							
Fiscal year	Passengers carried (000)	RPK (MYR million)	ASK (MYR million)	Load factor (%)	Distance flown (000 km)	Number of employees	Revenue per employee
30-Jun-01	291	363	586	62	4,440	241	0.70
30-Jun-02	611	672	1,018	66	7,356	322	0.68
30-Jun-03	1,481	1,539	2,086	74	14,099	648	0.51
30-Jun-04	2,839	2,771	3,592	77	24,278	1,382	0.28
30-Jun-05	4,414	4,881	6,525	75	41,655	2,016	0.33
30-Jun-06	5,719	6,702	8,646	78	56,218	2,224	0.39
30-Jun-07	8,738	9,863	12,391	78	74,196	2,924	0.55
31-Dec-07*	5,198	5,930	7,919	78	45,554	3,474	0.32
31-Dec-08	11,808	14,439	19,217	75	107,565	3,799	0.69
31-Dec-09	14,253	16,890	22,159	75	123,183	4,597	0.68
31-Dec-10	16,055	18,499	24,362	78	135,608	4,702	0.84
31-Dec-11	17,987	21,037	26,074	80	145,079	5,137	0.88
31-Dec-12	19,679	22,731	28,379	80	157,861	5,644	0.88
31-Dec-13	21,853	26,607	33,401	80	173,555	6,089	0.84

Notes: *Variable definitions*: ASK is available seat kilometres; RPK is revenue passenger kilometres.

\*AirAsia changed fiscal year from June to December in 2007.

\*\*Malaysia Airlines changed fiscal year from March to December in 2005.

**Table 2** Operating performance (continued)

<i>Panel C: Malaysia Airlines</i>									
<i>Fiscal year</i>	<i>Passengers carried (000)</i>	<i>RPK (MYR million)</i>	<i>ASK (MYR million)</i>	<i>Load factor (%)</i>	<i>Distance flown (000 km)</i>	<i>Number of employees</i>	<i>Revenue per employee</i>		
31-Mar-02	15,734	34,709	52,595	66	201,189	21,438	0.39		
31-Mar-03	16,325	37,653	54,266	69	228,762	21,916	0.40		
31-Mar-04	15,375	37,659	55,692	68	227,865	20,789	0.41		
31-Mar-05	17,536	44,226	64,115	69	265,050	22,513	0.49		
31-Dec-05**	13,852	35,605	49,786	72	207,117	22,835	0.39		
31-Dec-06	15,466	41,100	58,924	70	249,925	19,596	0.67		
31-Dec-07	14,213	40,162	56,228	71	239,699	19,423	0.76		
31-Dec-08	13,760	36,176	53,379	68	236,031	19,094	0.79		
31-Dec-09	20,733	33,455	48,762	69	264,979	19,147	0.59		
31-Dec-10	16,651	38,653	50,818	76	244,769	20,000	0.65		
31-Dec-11	17,046	41,645	55,874	75	261,209	20,477	0.67		
31-Dec-12	15,708	38,144	51,224	75	237,618	19,406	0.68		
31-Dec-13	13,870	48,323	59,932	81	219,961	19,577	0.74		

Notes: *Variable definitions*: ASK is available seat kilometres; RPK is revenue passenger kilometres.

\*AirAsia changed fiscal year from June to December in 2007.

\*\*Malaysia Air lines changed fiscal year from March to December in 2005.

Table 3 Pearson correlation statistics

	Revenue	EBIT	CFO	ROA	ROE	PG_Carried	LoadF	ASK	RPK	Distance	Emp	RevP/ASK	Lev
Revenue	1												
EBIT	-0.416**	1											
CFO	0.039	0.679***	1										
ROA	0.357	0.000	0.414**	1									
ROE	-0.581***	0.726***	0.040	0.926***	1								
PG_Carried	-0.607***	0.860***	0.495**	<0.0001	0.012	<0.0001							
LoadF	0.001	<0.0001	0.150	-0.401**	-0.339*	1							
ASK	0.001	0.842	0.473	0.047	0.098	0.031	1						
RPK	-0.330	0.300	0.202	0.349*	0.266	0.031	0.031	1					
Distance	0.108	0.146	0.332	0.087	0.198	0.884	0.884	0.743***	1				
Emp	0.945***	-0.363*	-0.079	-0.602***	-0.588***	0.743***	-0.363*	0.075	<0.0001	0.075			
RevP/ASK	<0.0001	0.074	0.706	0.002	0.002	<0.0001	0.762***	-0.274	0.994***	1			
Lev	0.947***	-0.357*	-0.077	-0.601***	-0.593***	0.762***	-0.274	0.994***	1				
	<0.0001	0.080	0.715	0.002	0.002	<0.0001	0.185	<0.0001	<0.0001	0.974***	1		
	0.931***	-0.315	-0.077	-0.596***	-0.580***	0.835***	-0.319	0.979***	0.974***	1			
	<0.0001	0.125	0.715	0.002	0.002	<0.0001	0.121	<0.0001	<0.0001	<0.0001	1		

Notes: *Variable definitions:* Revenue is sales; EBIT is earnings before interest and tax; CFO is operating cash flow; ROA is EBIT divided by average total assets; ROE is EBIT divided by average total shareholders' equity; PG\_Carried is passengers carried; LoadF is load factor; ASK is available seat kilometres; RPK is revenue passenger kilometres; distance is distance flown; Emp is a number of employees; RevP/ASK is revenue per available seat kilometres; and Lev is average total assets divided by average total shareholders' equity.  
 \*, \*\*, \*\*\*Indicate statistical significance at 10%, 5%, and 1% levels, respectively.



Table 3 Pearson correlation statistics (continued)

	Revenue	EBIT	CFO	ROA	ROE	PG_Carried	LoadF	ASK	RPK	Distance	Emp	RevPASK	Lev
Emp	0.920***	-0.496**	-0.193	-0.645***	-0.636***	0.601***	-0.479**	0.964***	0.945***	0.928***	1		
RevPASK	<0.0001	0.012	0.355	0.001	0.001	0.002	0.016	<0.0001	<0.0001	<0.0001			
Lev	0.850***	-0.346*	-0.253	-0.540***	-0.525***	0.416**	-0.344*	0.681***	0.691***	0.687***	0.669***	1	
	<0.0001	0.090	0.223	0.005	0.007	0.039	0.092	0.000	0.000	0.000	0.000		
	0.475**	-0.193	-0.165	-0.220	-0.269	0.459**	0.285	0.437**	0.486**	0.472**	0.394*	0.371*	1
	0.016	0.354	0.429	0.290	0.194	0.021	0.167	0.029	0.014	0.017	0.051	0.068	

Notes: *Variable definitions:* Revenue is sales; EBIT is earnings before interest and tax; CFO is operating cash flow; ROA is EBIT divided by average total assets; ROE is EBIT divided by average total shareholders' equity; PG\_Carried is passengers carried; LoadF is load factor; ASK is available seat kilometres; RPK is revenue passenger kilometres; distance is distance flown; Emp is a number of employees; RevPASK is revenue per available seat kilometres; and Lev is average total assets divided by average total shareholders' equity.

\*, \*\*, \*\*\* Indicate statistical significance at 10%, 5%, and 1% levels, respectively.

We analyse ROA and ROE decomposition in Table 4. In panel A, the descriptive statistics indicate that AirAsia had significantly higher operating margin (t-stat = 6.38), ROA (t-stat = 3.86), and ROE (t-stat = 3.89) than MAS. However, Air had significantly lower financial leverage (t-stat = -1.92) than MAS. Table 4, panels B and C reports results of DuPont Analysis of AirAsia and MAS by fiscal year. In the early period (2003–2004), AirAsia had higher ROA and ROE than MAS. AirAsia's ROA and ROE increased in 2003 and reached the highest levels at 26% (for ROA) and 61% (for ROE) in 2004. This is mainly because AirAsia's operating margin increased and was higher than MAS's. Moreover, it could utilise assets better than MAS although its asset turnover decreased over time. AirAsia's asset turnover was 4.23 time in 2002 and declined to 1.12 time in 2004. The asset turnover of MAS ranged from 1.30 to 1.52 times in the early period.

In the mid-period (2005–2008), both airline companies had a decline in ROA and ROE but AirAsia still had better financial performance, which was primary due to high operating margin. AirAsia's operating margin ranged from 10% in 2006 to 21% in 2007, but MAS's operating margin was lower than 5% and negative in 2005–2006. However, MAS had better asset utilisation than AirAsia. Its asset turnover was 1.5 time on average, while AirAsia's asset turnover decreased from 0.59 time in 2005 to 0.28 time in 2008. Financial leverage of AirAsia increased every year from 1.34 time in 2005 to 4.31 time in 2008. MAS's financial leverage ranged from 2.37 to 3.41 times, which was comparable to AirAsia's.

In the later period (2009–2013), AirAsia's financial performance was still higher than MAS's. The ROA and ROE of MAS were mostly negative in the later period, suggesting that the company had difficulty in generating profit. These are mainly due to the negative operating margin and the decline in asset turnover. In addition, MAS's financial leverage drastically increased and reached 9.41 times in 2012. AirAsia's operating margin in the later period was higher than other periods although it declined in 2011–2013. Although its asset turnover decreased and was at 0.3 time on average, its financial leverage decreased over time. Hence, AirAsia could maintain positive ROA and ROE in the period when jet fuel prices rose. In sum, the low-cost carrier strategy helped AirAsia achieve higher profitability than MAS and remain profitable during tough periods.

Table 5 presents the regression of financial measures (i.e., *ROE* and *ROA*) on operating measures in models (1) and (2). We find that the coefficients on *RevPASK* ( $\beta_2 = 6.30$  and  $2.27$ , respectively) are positive and statistically significant, suggesting that profitability (*ROE* and *ROA*) increases with higher *RevPASK*. The coefficients on *AirAsia* ( $\beta_1$ ) are significantly positive but the coefficients on *AirAsia*  $\times$  *RevPASK* ( $\beta_3$ ) are significantly negative. The findings indicate that AirAsia has higher *ROE* and *ROA* but lower *RevPASK* than MAS. The log of passengers carried (*Log\_PG*) is positively associated with the financial measures. The coefficients on *MID* and *LATER* are negative and statistically significant, suggesting that *ROE* and *ROA* in the mid-period (2005–2008) and later period (2009–2013) are lower than the early period (2001–2004). This is consistent with higher fuel cost in 2008 and greater competition in the airline industry in the later period than in the early period.

**Table 4** Decomposition of ROA and ROE

<i>Panel A: Descriptive statistics</i>										
<i>Variable</i>	<i>AirAsia</i>				<i>Malaysia Airlines</i>				<i>Mean difference</i>	<i>t-stat</i>
	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>		
Operating margin (%)	17%	8%	-1%	28%	-3%	7%	-16%	4%	20%	6.38***
Asset turnover	1.05	1.39	0.19	4.32	1.29	0.37	0.74	1.98	-0.24	-0.6
ROA (%)	8%	7%	-3%	26%	-4%	9%	-20%	7%	12%	3.86***
Financial leverage	2.81	1.50	-0.98	4.95	4.23	2.18	2.19	9.41	-1.42	-1.92*
ROE (%)	25%	16%	3%	61%	-17%	34%	-97%	18%	42%	3.89***
<i>Panel B: AirAsia</i>										
	<i>(1) Operating margin</i>	<i>(2) Asset turnover</i>	<i>(3) = (1) × (2) ROA</i>	<i>(4) Financial leverage</i>	<i>(5) = (3) × (4) ROE</i>					
30-Jun-02	-1%	4.23	-3%	-0.98	3%					
30-Jun-03	3%	2.65	13%	3.41	45%					
30-Jun-04	15%	1.12	26%	2.38	61%					
30-Jun-05	19%	0.59	17%	1.34	23%					
30-Jun-06	10%	0.36	5%	1.76	9%					
30-Jun-07	13%	0.34	6%	2.65	16%					
31-Dec-07#	21%	0.17	4%	2.99	12%					
31-Dec-08	17%	0.28	6%	4.31	24%					
31-Dec-09	27%	0.27	8%	4.95	40%					
31-Dec-10	28%	0.30	9%	3.93	35%					
31-Dec-11	22%	0.32	7%	3.54	26%					
31-Dec-12	22%	0.30	7%	3.08	22%					
31-Dec-13	17%	0.29	5%	3.17	16%					
<i>Panel C: Malaysia Airlines</i>										
	<i>(1) Operating margin</i>	<i>(2) Asset turnover</i>	<i>(3) = (1) × (2) ROA</i>	<i>(4) Financial leverage</i>	<i>(5) = (3) × (4) ROE</i>					
31-Mar-03	3%	1.52	2%	5.35	13%					
31-Mar-04	0%	1.30	1%	2.19	1%					
31-Mar-05	3%	1.48	4%	2.21	9%					
31-Dec-05##	-15%	1.40	-20%	2.57	-51%					
31-Dec-06	-6%	1.89	-12%	3.41	-42%					
31-Dec-07	4%	1.46	7%	2.76	18%					

Notes: *Variable definitions*: Operating margin is EBIT divided by sales; asset turnover is sales divided by average total assets; ROA is EBIT divided by average total assets; financial leverage is average total assets divided by average total shareholders' equity; and ROE is EBIT divided by average total shareholders' equity.

#AirAsia changed fiscal year from June to December in 2007.

##Malaysia Airlines changed fiscal year from March to December in 2005.

\*, \*\*\*Indicates statistical significance at 10% and 1% levels, respectively.

**Table 4** Decomposition of ROA and ROE (continued)

<i>Panel C: Malaysia Airlines</i>					
	(1) Operating margin	(2) Asset turnover	(3) = (1) × (2) ROA	(4) Financial leverage	(5) = (3) × (4) ROE
31-Dec-08	2%	1.49	3%	2.37	7%
31-Dec-09	-6%	1.33	-7%	3.78	-26%
31-Dec-10	2%	1.04	3%	4.92	12%
31-Dec-11	-16%	1.09	-18%	5.46	-97%
31-Dec-12	-3%	0.77	-2%	9.41	-23%
31-Dec-13	-5%	0.67	-3%	6.36	-22%

Notes: *Variable definitions:* Operating margin is EBIT divided by sales; asset turnover is sales divided by average total assets; ROA is EBIT divided by average total assets; financial leverage is average total assets divided by average total shareholders' equity; and ROE is EBIT divided by average total shareholders' equity.  
 #AirAsia changed fiscal year from June to December in 2007.  
 ##Malaysia Airlines changed fiscal year from March to December in 2005.  
 \*, \*\*Indicates statistical significance at 10% and 1% levels, respectively.

**Table 5** Regression analysis

Variables	(1) ROE	(2) ROA	(3) RevPASK
<i>AirAsia</i>	2.27*** (3.57)	0.92*** (6.30)	-0.00 (-0.06)
<i>RevPASK</i>	6.30** (2.75)	2.27*** (4.28)	
<i>AirAsia</i> × <i>RevPASK</i>	-7.65** (-2.46)	-3.86*** (-5.37)	
<i>Log_PG</i>	0.29*** (2.92)	0.07*** (3.28)	
<i>MID</i>	-0.69*** (-3.83)	-0.23*** (-5.56)	0.07*** (3.53)
<i>LATER</i>	-0.87*** (-3.78)	-0.25*** (-4.79)	0.09*** (4.22)
<i>AirAsia</i> × <i>MID</i>			-0.11*** (-3.89)

Notes: t-statistics in parentheses.

\*, \*\*, \*\*\* indicate significance (two-tailed) at the 10%, 5%, and 1% levels, respectively.

*Variable definitions:* ROE is EBIT divided by average total shareholders' equity. ROA is EBIT divided by average total assets. *AirAsia* is a dummy variable that equals one if a firm is AirAsia, and zero otherwise; *RevPASK* is revenue per available seat kilometres; *Log\_PG* is the log of passengers carried; *MID* is a dummy variable that equals one if the period is 2005–2008, and zero otherwise; *LATER* is a dummy variable that equals one if the period is 2009–2013, and zero otherwise.

**Table 5** Regression analysis (continued)

Variables	(1) ROE	(2) ROA	(3) RevPASK
<i>AirAsia</i> × <i>LATER</i>			-0.08*** (-2.97)
Constant	-3.73*** (-3.12)	-1.07*** (-3.88)	0.16*** (10.13)
Observations	25	25	25
Adj R <sup>2</sup>	0.59	0.75	0.74

Notes: t-statistics in parentheses.

\*, \*\*, \*\*\* indicate significance (two-tailed) at the 10%, 5%, and 1% levels, respectively.

*Variable definitions:* *ROE* is EBIT divided by average total shareholders' equity. *ROA* is EBIT divided by average total assets. *AirAsia* is a dummy variable that equals one if a firm is AirAsia, and zero otherwise; *RevPASK* is revenue per available seat kilometres; *Log\_PG* is the log of passengers carried; *MID* is a dummy variable that equals one if the period is 2005–2008, and zero otherwise; *LATER* is a dummy variable that equals one if the period is 2009–2013, and zero otherwise.

Model (3) shows the regression result of *RevPASK* on time periods. The coefficients on *MID* (0.07) and *LATER* (0.09) are positive and significant, indicating that *RevPASK* in the mid and later periods are higher than the early period because the number of passengers increased over time. The coefficients on the interaction between *AirAsia* and time periods (*MID* and *LATER*) are negatively significant, suggesting that AirAsia has lower *RevPASK* in the mid and later periods than MAS.

### 3.2 Sensitivity analyses

In Table 6, we perform the following robustness checks. First, to examine the effect of airfares on financial performance, we use revenues per passenger (*RevPPG*) to proxy for airfares and substitute it for *RevPASK* in regression models in Table 6, panel A, columns (1) to (3). The results are qualitatively similar to the main findings. *RevPPG* is positively associated with financial performance. AirAsia has significantly higher ROE and ROA, but lower *RevPPG* than MAS.

Second, in addition to using a revenue-based measure (i.e., *RevPASK*) to explain the difference in financial and operating performance between the two airlines, we include cost per available seat kilometre (*CostPASK*) to proxy for a cost-based measure and substitute it for *RevPASK*. Results are shown in Table 6, panel B, columns (4) to (6). AirAsia has significantly higher ROA than MAS [column (5)]. The coefficient on *CostPASK* is not statistically significant. The coefficient of an interaction between AirAsia and *CostPASK* is positively associated with ROA (t-stat = 3.22), suggesting that the low-cost strategy helped AirAsia achieve higher ROA. The results are also consistent for other variables.

Table 6 Sensitivity analysis

Variables	Panel A: (1)–(3)			Panel B: (4)–(6)			Panel C: (7)–(8)	
	(1) ROE	(2) ROA	(3) RevPPG	(4) ROE	(5) ROA	(6) CostPASK	(7) Asset turnover	(8) Operating margin
<i>AirAsia</i>	1.54*** (3.30)	0.63*** (5.60)	-0.33*** (-3.31)	1.24 (1.48)	0.69*** (3.29)	0.01 (0.24)	-1.70 (-1.37)	0.57*** (3.33)
<i>RevPPG</i>	0.88* (2.10)	0.31*** (3.10)						
<i>AirAsia</i> × <i>RevPPG</i>	-2.09 (-1.52)	-1.37*** (-4.11)						
<i>CostPASK</i>				-1.75 (-0.56)	-1.37 (-1.72)			
<i>AirAsia</i> × <i>CostPASK</i>				4.14 (1.04)	3.22*** (3.22)			
<i>RevPASK</i>							6.01 (1.35)	1.15* (1.85)
<i>AirAsia</i> × <i>RevPASK</i>							8.56 (1.41)	-1.33 (-1.58)
<i>Log_PG</i>	0.19* (2.09)	0.04 (1.71)		0.14 (1.02)	0.04 (1.03)		-0.80*** (-4.19)	0.11*** (4.11)

Notes: t-statistics in parentheses.  
 \*, \*\*, \*\*\* indicate significance (two-tailed) at the 10%, 5%, and 1% levels, respectively.  
 Variable definitions: *RevPPG* is revenues per passengers carried; *CostPASK* is the negative value of cost per available seat kilometres; *asset turnover* is sales divided by average total assets; *operating margin* is EBIT divided by sales. Other variables are as defined in the previous table.

Table 6 Sensitivity analysis (continued)

Variables	Panel A: (1)–(3)			Panel B: (4)–(6)			Panel C: (7)–(8)	
	(1) ROE	(2) ROA	(3) RevPPG	(4) ROE	(5) ROA	(6) CostPASK	(7) Asset turnover	(8) Operating margin
MID	-0.54*** (-3.26)	-0.17*** (-4.27)	0.33*** (3.54)	-0.47* (-1.88)	-0.20*** (-3.12)	-0.08*** (-4.25)	-0.59 (-1.67)	-0.10** (-2.15)
LATER	-0.58*** (-3.12)	-0.15*** (-3.28)	0.23** (2.59)	-0.54 (-1.63)	-0.21** (-2.46)	-0.10*** (-5.37)	-0.81* (-1.80)	-0.14** (-2.24)
AirAsia × MID			-0.39*** (-2.98)			0.14*** (4.97)		
AirAsia × LATER			-0.23* (-1.82)			0.13*** (4.93)		
Constant	-2.25** (-2.36)	-0.52** (-2.27)	0.57*** (8.04)	-1.58 (-0.90)	-0.55 (-1.24)	-0.16*** (-10.61)	8.22*** (3.52)	-1.25*** (-3.84)
Observations	25	25	25	25	25	25	25	25
Adj R <sup>2</sup>	0.54	0.68	0.85	0.44	0.59	0.85	0.83	0.78

Notes: t-statistics in parentheses.  
 \*, \*\*, \*\*\* indicate significance (two-tailed) at the 10%, 5%, and 1% levels, respectively.  
 Variable definitions: RevPPG is revenues per passengers carried; CostPASK is the negative value of cost per available seat kilometres; asset turnover is sales divided by average total assets; operating margin is EBIT divided by sales. Other variables are as defined in the previous table.

Finally, we disaggregate ROA into asset turnover and operating margin according to DuPont analysis. We replace ROA with asset turnover [column (7)] and operating margin [column (8)] and rerun the regression in equation (2). Results are shown in Table 6, panel C, columns (7) and (8). We find that the results are consistent for the operating margin model. Hence, the higher ROA of AirAsia is driven by operating margin and not asset turnover.

#### 4 Discussion

We examine the revenue and profitability of two competing airline companies – AirAsia and Malaysia Airlines – over the period 2001 to 2013. Malaysia Airlines is a legacy carrier that began operations in 1947 while AirAsia entered in 2001 as a low-cost carrier. After AirAsia entered the market, Malaysia Airlines saw a decline in the RPK and ASK in the mid-period (2005–2009). It had losses in 2011–2013 due to the depreciation of the Ringgit against the US dollar, in which 60% of its costs were in US dollars, and an increase in operating costs such as fuel which increased by almost 11% over the 12-month period between 2012–2013 (Malaysia Airlines, 2013). Moreover, Malaysia Airlines was impacted by the intensifying competition from the low-cost carrier continuing to dominate its short-haul markets. In contrast, AirAsia had an increasing trend of RPK and ASK over time, suggesting the successful strategy of a low-cost carrier. AirAsia was more profitable, earning higher ROE and ROAs than Malaysia Airlines. This is consistent with Ong and Tan (2010) that AirAsia is very profitable, fast-growing, entrepreneurial, and challenging. However, AirAsia had lower RevPASK than Malaysia Airlines, probably due to lower fares. This case study provides interesting insights of competing strategies in the airlines industry. In summary, the entry of a low-cost carrier did have impact on the financial and operating performance of the legacy carrier.

This study is subject to some limitations. First, the sample size is very small; thus, the regression analysis should be interpreted with caution. Second, some important factors are not directly observable and examined in this study such as management skills, corporate culture, customer satisfaction, etc. Further investigation of these influential factors can be an avenue for future research.

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