

A COMPARATIVE ANALYSIS OF FINANCIAL AND OPERATIONAL PERFORMANCE PRE - AND POST-IPO: WITH A FOCUS ON AIRLINE COMPANIES

Soomi Lee, Korea Aerospace University
Hayoung Kim, Korea Aerospace University
Namryoung Lee, Korea Aerospace University

ABSTRACT

In this study, the financial and operational performance of 12 global LCCs before and after going public with IPOs are compared and analyzed. The analysis reveals that the current ratio increases and the leverage decreases in multiple sample enterprises after an IPO. It is also observed that profitability improves, although this finding is not consistent. These results indicate that enterprise liquidity improves and that management will actively seek improvement activities based on the inflow of large amounts of funding provided by the IPO. Asset turnover, which is an activity index, decreases, but this is interpreted as a temporary phenomenon that appears because the investment assets increase compared to sales as funds are secured. In addition, it is confirmed that after an IPO, operational performance indicators, including the load factor (seat occupancy), ASK (available seat kilometers), and RPK (revenue passenger kilometers), also improve.

Keywords: Airline Company, IPO, Financial Performance, Operational Performance.

INTRODUCTION

Because the acquisition of aircraft requires considerable funding, the airline industry is a representative capital-intensive industry, and determining how to acquire the aircraft is very important for airlines. In the early stages of airline finance, which started in the 1970s, aircraft acquisition costs were secured through loans. Bank credit is an important source of funding for all growth companies (Robb & Robinson, 2014). However, it ultimately results in increased debt ratios. Leasing represents an alternative method of securing the necessary capital. In particular, the leasing choices made by airlines are of strategic importance from the perspective of financial performance. For tax purposes, there is a tendency to report them as capital leases, whereas for financial reporting purposes, they are reported as operating leases (Amoruso & Duchac, 2014). When considering the benefits of strategic leasing, low cost carriers (LCCs) stand to gain more than full cost carriers (FCCs), and the younger the age of the enterprise, the greater the benefits that can be achieved (Bourjade et al., 2017).

As such, when funds are raised strategically through leasing, it would be expected that financial soundness could be maintained. However, the International Accounting Standards Board (IASB) has announced new lease accounting standards, and these standards are expected to have a very significant impact on the financial positions of enterprises that acquire aircraft through leasing. The former lease accounting standards provided that if a contract was reported as an operating lease, it did not have to be reported as lease assets or lease liabilities in the

statement of financial position. However, as this is no longer allowed, when an enterprise with a high proportion of lease operation applies new lease accounting standards, the assets and the liabilities that have not been reported thus far should be reported in the accounting. Therefore, it is expected that the debt ratio and loans will increase for enterprises with higher proportions of leases, including air carriers, the marine transportation businesses, and so on. In addition, this may have an impact on EBITDA, the current ratio, and the interest coverage ratio, which would likely elicit material differences in accounting and have a major impact on profitability (Imhoff et al., 1991; Karwowski, 2016). Imhoff et al. (1993) verified the particular influence of converting operating leases into capital leases on the airline industry, and Kostolansky & Stanko (2013) confirmed that liabilities increased in a considerable number of sample enterprises. Of note, airline companies that had reported leases as operating leases expressed concern that this would have a negative influence on stock prices due to the influence of increases to the debt ratio, as well as other factors.

Meanwhile, Durmaz & Adiller (2010) suggested that business strategies were key to the sustainability of aviation firms in highly competitive environments. In the airline market, which has shown a trend toward continuous growth, the competition for sustainability between FCCs and LCCs is fierce. LCCs actively seek to enhance the value of their enterprise through such techniques as the increase of turnover and the expansion of sales. By extension, they are moving away from existing survival strategies that are dependent on price competitiveness. However, for LCCs, which acquire most of their aircraft via operating leases, when new lease accounting standards is applied, it is expected that total borrowing and bonds payable to total assets, and the debt ratio will increase. This is because most of the lease contracts are reflected in the financial statements as liabilities.

Investments through fund raising can have a positive influence on the performance of an enterprise. The large-scale funds that can be raised via an IPO can have an impact on the improvement of productivity, gaining competitive advantage through the development of technology, the performance of the enterprise, and stock prices (Ravenscraft & Scherer, 1982; Jain & Kini, 2008). In the airline industry, where fund-raising is critical due to the high cost of aircraft, enterprises perform debt-capital financing or equity-capital financing for financial sustainability. Both methods are intended to raise funds, but from the enterprise's perspective, equity-capital financing might be more favorable (Lee et al., 2016).

Firms try to raise external funds at the most appropriate time. In the case of unlisted companies, the IPO allows companies seek to fund large new investments. According to the pecking order theory, equity financing through an IPO is the least preferable way of financing (Myers, 1984). Companies prefer internal financing rather than external financing which requires a high cost of issuance and much information disclosure. When external financing is inevitable, firms rely first on debt financing, then equity financing, due to cost of equity. Especially, high profitable firms tend to favor debt financing rather than equity financing (Martin & Scott, 1974). However, as debt increases, the likelihood of bankruptcy increases, resulting in an increase in financial distress costs. Adequate balance of debt and equity is the key for the optimal capital structure, leading to maximization of firms' value. Equity financing allows direct financing at low cost without the involvement of banks of venture capitalists (Diamond, 1991; Holmstrom & Tirole, 1993). Initial public offerings (IPO's) are an important source of financing for investments.

A numerous studies are found on IPOs. There are two broad streams. The first stream is about motive for IPOs. The reasons for IPOs vary, but mainly for raising funds for investments

and growth opportunities (Kim & Weisbach, 2008; Lowry, 2003) or rebalancing capital structure through debt repayment (Rajan, 1992; Pagano et al, 1998). Companies with high leverage are more likely to execute IPOs Myers (1977). Debt repayment through the IPO positively affect firm growth (Fan, 2019).

As the second stream, numerous empirical studies investigate the post-IPO performance. Performance deterioration during the post-IPO period appeared in number of studies (Mikkelson et al., 1997; Jain and Kini, 1994 &1995; Wang et al., 2003; Cai & Wei, 1997; Wang, 2005). Performance decline post-IPO may be explained by information asymmetries due to increased agency costs as management ownership decreases post-IPO (Jensen & Meckling, 1976; Jain & Kini, 1994). Another explanation for underperformance post-IPO may be due to accounting data manipulation pre-IPO to attract potential investors - the windows of opportunity (Laughran & Ritter, 1995).

An IPO does not always lead to success. Successful IPOs depend on timing and market conditions. Because enterprises attempt to control timing with consideration given to numerous factors, there exists “hot” and “cold” IPO markets (Henry & Gregoriou, 2014; Ritter, 1984; Loughran et al., 1994). In 2018, one LCC in Korea failed in its public offering, most likely due to market volatility. In addition, raising capital through an IPO or similar tactic is important, but it should lead to sustainable growth. This is the motivation for this research. Therefore, in this study, IPO cases of 12 global LCCs will be examined, and the influence of the IPOs on the financial and operational performance of aviation firms will be investigated. This study is intended to provide implications for enterprises that seek to release an IPO in future, and for market stakeholders, who are tasked with distinguishing between good and bad when the listings of domestic LCCs are made available. The remainder of the paper is organized as follows. Chapter 2 provides IPO status of Korean LCCS and literature review. Chapter 3 discusses data and methodology. Chapter 4 presents analysis results. Chapter 5 discusses the results and concludes.

IPO STATUS OF KOREAN LCCS AND LITERATURE REVIEW

In 2019, airlines in Korea faced rapid environmental changes. Licenses for new LCCs such as Aero K, Air Premia, Fly Gangwon, and Air Philip were granted by the Ministry of Land, Infrastructure and Transport, and there is concern over the fierce competition among airlines. In addition, because the operational leases of aircraft are not permitted according to the new lease accounting standards, a lease user should report the rights and obligations generated under a lease contract as assets and liabilities in the financial statements, and accordingly, the debt ratio will increase.

It is therefore expected that airlines will face greater burdens. In light of these uncertain environmental changes, LCCs in Korea are hastily promoting initial public offerings (IPOs) to secure large-scale funding.

Currently, among the six LCCs in Korea, four have released an IPO. Jeju Air listed in 2015, Jin Air listed in 2017, and T’way Air and Air Busan both listed in 2018. Eastar Air is expected to follow suit. To lead the airline industry and consolidate their position through aircraft acquisition, route expansion, and job creation, IPOs are considered attractive propositions. However, T’way and Air Busan, the two LCCs that listed in 2018, have not yet been able to garner positive outcomes due to adverse market conditions. Among domestic LCCs, Jeju Air is seeking to expand into new territory for its 14th anniversary, recording stable sales

and operating profit through its successful IPO in 2015. One study of note attempted to analyze 2000 listed enterprises in Korea as well as another 1000 listed enterprises in the United States and China. The study found that 10 American enterprises (e.g., Amazon and Netflix) and several Chinese enterprises (e.g., Tencent) had increased their sales by more than 10% for 10 consecutive years. In Korea, only Jeju Air and Jin Air (both of which are LCCs) achieved this distinction¹.

IPOs enable airlines to secure adequate financial resources, thereby providing the consistent driving power to obtain significant funding to purchase aircraft. This allows them to create jobs, expand their routes, and improve their financial soundness. In addition, the IPO represents an opportunity for the enterprise to grow and increase equity capital (Lowry, 2003). This is not unique to Korea. For instance, in Germany, which is a closed-end participatory market, airlines raise funds to purchase aircraft or invest in new routes by increasing their equity. In Singapore, Tiger Airways Holding Ltd., which is an LCC owned by Singapore Airlines, used part of its IPO revenue to acquire new aircraft (Bjelicic, 2012).

According to the research results offered by Lee et al. (2016), in the case of aerospace firms, raising funds via equities is positively associated with net income, but raising funds via debts is negatively associated with net income. IPOs are an essential means of securing aviation financing, and they are accordingly very important. However, this insinuates that an IPO should ultimately lead to sustainable growth. Once a company has gone public, it must continue to increase its capital and invest in new routes or new aircraft to grow its business (Bjelicic, 2012). The considerable funds raised by the IPO are invested into R&D activities or capital expenditure (Kim & Weisbach, 2008). R&D investment increases long-term enterprise value rather than short-term earnings targets (Almeida & Campello, 2007). Therefore, if the enterprise is financially distressed, it will convey a trend of decreasing or delaying investment (Minton & Schrand, 1999; Boyle & Guthrie, 2003; Campello et al., 2010; Hirth & Viswanatha, 2011; Keefe & Tate, 2013).

In the meantime, some enterprises use the raised funds for debt retirement (Busaba et al., 2001; Dunbar & Foerster, 2008). In the preceding research, some studies have reported the opinion that using the funds raised by an IPO for new investment has a positive influence on long-term enterprise performance, but there also exist opposing claims that using gains for debt retirement has a negative influence on the long-term development of an enterprise (Wyatt, 2014; Amor & Kooli, 2017). Fan (2019) examined how debt retirement at the time of an IPO was associated with firm growth and found that highly leveraged firms were likely to use IPOs for debt retirement. His research confirmed that using IPOs for debt retirement had long-term effects that induced higher performance by improving the ability to pay back debt and reduce interest burdens.

DATA AND METHODOLOGY

This study used hand-collected data for 12 LCCs that have engaged in IPOs – four in North America, one in South America, one in Europe, two in Northeast Asia, three in Southeast Asia, and one in Oceania. To compare financial ratios, the financial data before and after the IPOs were collected through financial reports or annual reports published by the companies. “Previous studies related to IPO have mainly focused on the comparison of performance evaluation before and after the IPOs. Among financial ratios for performance evaluation, the most commonly used financial ratio is ROA (Return on Assets) (Jain & Kini, 1994; Mikkelsen et

al., 1997; Wang, 2005; Balatbat et al., 2004). ROE (Return on Equity) and ROS (Return on Sales) are also frequently used for profitability measurement. The main analysis method of this study is to compare the financial and operational performance of LCCs before and after the IPOs. For the analysis, the financial data before and after the IPOs were collected through financial reports or annual reports published by the companies. In addition to profitability index, other financial performance indices including liquidity, leverage, and activity were compared in this study. Considering the specific characteristics of the airline industry, operational performance indicators such as Yield the average fare per passenger per mile, Load Factor profitability in terms of the seat occupancy, ASK an index related to transport capacity and supply, and RPK an index related to transportation or sales were also compared.”

The analysis period for the 12 LCCs was set to the fiscal years one year prior to the IPO and two to four years after the IPO.² Table 1 shows the sample companies and periods. The numbers in parenthesis refer to the number of years.

Company	Year of IPO	Pre IPO	Post IPO
JetBlue	2002	2001(1)	2002-2005(4)
Spirit Airlines	2011	2010(1)	2011-2014(4)
Virgin America	2014	2013(1)	2014-2015(2)
WestJet Airlines	1999	1998(1)	1999-2002(4)
Jeju Air	2015	2014(1)	2015-2017(3)
Spring Airlines	2015	2014(1)	2015-2017(3)
AirAsia X	2013	2012(1)	2013-2016(4)
Nok Air	2013	2012(1)	2013-2016(4)
Cebu Pacific	2010	2009(1)	2010-2013(4)
Gol Airlines	2004	2003(1)	2004-2007(4)
Air Berlin	2006	2005(1)	2006-2009(4)
Virgin Australia Airlines	2004	2003(1)	2004-2007(4)

To perform a comparative analysis on the financial performance of the LCCs pre- and post-IPO, the (1) profitability index, (2) liquidity index, (3) leverage index, and (4) activity index, which are representative financial ratio indices, were examined.

First, for the profitability index, (1) return on assets (ROA), (2) return on equity (ROE), and (3) return on sales (ROS) were examined. ROA represents the proportion occupied by net income in the total assets. A high ROA indicates that the profit is higher compared to assets, which means that the enterprise utilizes the held assets efficiently, and this becomes the criteria to assess the enterprise's ability to use limited resources efficiently. ROE refers to the financial ratio representing the firm's profitability directly related to amount shareholders have invested. This means that as the ROE increases, profitability improves and investor's money is operated more efficiently. ROS is an index to judge the comprehensive efficiency and represents the final profitability of the enterprise. As ROS increases, it becomes more feasible to perform a comparative analysis with enterprises of the same business.

Second, for the index to measure liquidity, the current ratio, which determines credit or solvency, was measured. A higher ratio indicates a greater ability to pay, but there are no absolute standards, and the substantial details of a particular enterprise, including size, business type, and trends, should be examined (Maeil Business News Korea).

Third, for the leverage index, the debt ratio, which shows how many debts the enterprise uses compared to assets, was measured. Because the leverage effect of the debts would amplify the profits of an enterprise, this effect can contribute to increasing stockholder profit, but it increases the earnings volatility, thereby increasing financial risk (Financial Supervisory Service, 2018). Fourth, the activity index was examined. This index can be used to examine how well an enterprise utilizes its assets, and it can be measured along with asset turnover, which is the net sales to total assets ratio.

The items and calculation formula of the financial ratio used in this study are shown below in Table 2.

Index	Variable	Measurement
Profitability Index	Return on Asset	(Net Income/Total Assets) X 100
	Return on Equity	(Net Income/Total Owners' Equity) X 100
	Net Profit Margin	(Net Income/Sales) X 100
Liquidity Index	Current Ratio	(Current Assets/Current Liabilities) X 100
Leverage Index	Debt Ratio	(Total Liabilities/Total Assets) X 100
Activity Index	Asset Turnover	(Net Sales/Total Assets) X 100

In this study, operational performance pre- and post-IPO was also compared and analyzed considering the special characteristics of the airline industry. To accomplish this, four variables were used yield, load factor, available seat kilometers (ASK), and revenue passenger kilometers (RPK). The first two were used as profitability variables, while ASK was used for transport capacity and supply, and RPK was used for capacity load and sales. The indices of operational performance used in this study are shown in Table 3.

Index	Variable	Definition
Profitability	Yield	Passenger kilometers or average income per cargo ton-kilometer
	Load Factor	Occupancy rate (seat occupancy rate)
Transport Capacity and Supply	ASK	Number of seats for sale multiplied by flight distance (Available seat kilometers)
Capacity Load and Sales	RPK	Airline traffic volume (Revenue passenger kilometers)

ANALYSIS RESULTS

Profitability

As shown in Table 4, the ROA for nine airlines decreased after the IPO was carried out, though this decrease was only significant for one of these airlines. These results are similar to those in a previous study that reported that ROA and cash utilization decreased after a listing (Jain & Kini, 1994).

ROE did increase significantly in four enterprises after the IPO, and it decreased significantly for three enterprises. It was asserted in an earlier study by Upadhyay (2016) that because a large amount of funds flowed in during the IPO at a time when the enterprise was not

ready to manage these funds efficiently or did not have a specific plan related to the investment of excess funds, the ROE may not have shown consistent results during the period before and two periods after the IPO. ROS increased for seven airlines after the IPO but was significant only in three airlines.

In detail, the ROA for JetBlue increased to 128% from 119.80% before the IPO. For Spirit Airlines, it increased to 89.10% from -68.98%, and for WestJet, Spring, and Air Berlin, it increased to 2.94%, 4.43% and 57.26%, respectively. However, for Jeju Air and Virgin Australia Airlines, the ROA decreased to -18.86% and -40.93% after the IPO. WestJet used its IPO revenue to buy new aircraft and build a new hangar and head office, and both the ROA and ROS increased after the IPO. Air Berlin, whose three profitability indices increased after the IPO, used some of the funds raised to pay back loans and used some as additional expansion funds, including for the cash purchase of aircraft worth 400 million Euros.

For the airline industry in general, the funds raised by IPOs frequently led to the immediate purchase of aircraft, and the increase in new aircraft would lead to the increased operation of existing routes and long-term increase in sales due to the expansion of new routes. Although consistent results are not shown, the positive outcomes for the profitability indices were verified in some airlines, and this is expected to improve profitability in the long-term.

Table 4
PROFITABILITY INDEX PRE- AND POST-IPO

Company	Financial Ratios	Mean Pre-IPO	Mean Post-IPO	Mean Difference	Standard Deviation	T value	P value
JetBlue	Return on Assets	5.72	2.48	-3.24	2.65	-1.219	0.310
	Return on Equity	-119.80	8.20	128.0	8.90	14.377	0.001
	Net Profit Margin	12.03	5.40	-6.62	5.83	-1.136	0.338
Spirit Airlines	Return on Assets	15.23	12.77	-2.45	2.40	-1.022	0.382
	Return on Equity	-68.98	20.12	89.10	3.54	25.159	0.000
	Net Profit Margin	9.28	9.43	0.152	2.35	0.065	0.952
Virgin America	Return on Assets	1.45	13.86	12.41	13.59	0.913	0.529
	Return on Equity	-2.64	27.61	30.25	25.15	1.203	0.442
	Net Profit Margin	0.71	13.14	12.43	15.78	0.788	0.575
WestJet Airlines	Return on Assets	6.02	8.34	2.32	1.35	1.712	0.185
	Return on Equity	13.20	16.14	2.94	1.19	2.469	0.090
	Net Profit Margin	5.20	8.04	2.84	0.79	3.577	0.037
Jeju Air	Return on Assets	12.14	9.47	-2.67	0.65	-4.072	0.055
	Return on Equity	39.96	21.09	-18.86	2.42	-7.780	0.016
	Net Profit Margin	6.27	7.55	1.28	0.46	2.764	0.110
Spring Airlines	Return on Assets	7.85	7.63	-0.22	0.83	-0.263	0.817
	Return on Equity	24.89	18.50	-6.38	1.82	-3.495	0.073
	Net Profit Margin	12.09	16.52	4.43	0.51	8.658	0.013
AirAsia X	Return on Assets	1.38	-4.80	-6.18	8.66	-0.714	0.527
	Return on Equity	5.79	-1806.13	-1811.92	3965.54	-0.457	0.679
	Net Profit Margin	0.68	-6.75	-7.43	10.69	-0.695	0.537
Nok Air	Return on Assets	22.41	-13.67	-36.08	35.85	-1.006	0.388
	Return on Equity	46.99	-84.95	-131.94	191.54	-0.689	0.540
	Net Profit Margin	6.11	-4.26	-10.37	13.59	-0.763	0.501
Cebu Pacific	Return on Assets	9.22	6.77	-2.44	6.03	-0.406	0.712
	Return on Equity	44.91	19.03	-25.87	16.69	-1.550	0.219
	Net Profit Margin	13.98	11.28	-2.69	10.43	-0.258	0.813
Gol Airlines	Return on Assets	25.61	17.61	-7.99	12.78	-0.625	0.576

	Return on Equity	55.75	28.35	-27.39	18.11	-1.512	0.228
	Net Profit Margin	12.53	17.39	4.86	11.94	0.407	0.711
Air Berlin	Return on Assets	-10.91	0.12	11.03	2.91	3.778	0.032
	Return on Equity	-58.77	-1.51	57.26	14.42	3.970	0.029
	Net Profit Margin	-10.30	0.37	10.67	2.51	4.243	0.024
Virgin Australia Airlines	Return on Assets	17.68	6.27	-11.40	5.32	-2.142	0.122
	Return on Equity	58.58	17.64	-40.93	14.25	-2.871	0.064
	Net Profit Margin	11.79	7.15	-4.63	5.32	-0.870	0.448

Liquidity

The current ratio is an index used to assess financial soundness and in particular is the criterion to assess the solvency and credit of the enterprise. Generally, as the current ratio increases, financial liquidity and short-term solvency are expected to improve. Maintaining the ratio at over 200% is considered ideal, although this differs according to industry. As shown in Table 5, it appears that the average increased in all samples after the IPO, and it was statistically significant in two of those samples. The current ratio for Spirit Airlines was 196.45%, an average increase of 79.29% after the IPO. The current ratio for Virgin America was 126.71%, an average increase of 16.02% after the IPO. Therefore, the overall liquidity increased after the IPO, improving the financial soundness.

Company	Mean Pre-IPO	Mean Post-IPO	Mean Difference	Standard Deviation	T value	P value
JetBlue	74.32	119.89	45.57	41.30	1.103	0.350
Spirit Airlines	117.16	196.45	79.29	3.34	23.734	0.000
Virgin America	110.15	126.17	16.02	0.03	462.458	0.001
WestJet Airlines	78.48	98.63	20.15	19.09	1.055	0.369
Jeju Air	130.99	155.92	24.93	34.18	0.729	0.542
Spring Airlines	69.29	94.35	25.06	13.92	1.800	0.214
AirAsia X	32.94	39.43	6.49	16.08	0.404	0.713
Nok Air	165.04	212.46	47.42	137.56	0.345	0.753
Cebu Pacific	53.37	87.88	34.51	32.02	1.078	0.360
Gol Airlines	141.54	227.06	85.52	70.13	1.219	0.310
Air Berlin	79.40	85.11	5.71	14.25	0.401	0.715
Virgin Australia Airlines	77.96	138.14	60.18	30.56	1.969	0.144

Leverage

It was confirmed that because enterprises had a tendency to pay back existing debts using the funds raised by IPOs, and because they could expand their business via the reduced interest burden, they could achieve high growth rates during the period after an IPO (Fan, 2019). In this study, as shown in Table 6, the debt ratio decreased in 11 samples after the IPO, and among them, six samples showed statistically significant results. Specifically, the debt ratio decreased by 85.49%, 100.45%, 14.70%, 9.68%, -14.04%, and 17.18% for Spirit Airlines, Virgin Airlines, Jeju Air, Spring Airlines, Cebu Pacific, and Gol Airlines, respectively.

Spirit Airlines paid back debts using the funds raised by its IPO, and Virgin America reduced its interest costs by 38% compared to the previous year through the adjustment of debts.

Jeju Air in Korea improved its financial soundness via the increase of cashable assets after its IPO.

Company	Mean Pre-IPO	Mean Post-IPO	Mean Difference	Standard Deviation	T value	P value
JetBlue	55.57	58.53	2.96	13.62	0.218	0.842
Spirit Airlines	122.09	36.59	-85.49	1.35	-63.309	0.000
Virgin America	151.73	51.28	-100.45	4.84	-20.712	0.031
WestJet Airlines	54.40	48.48	-5.91	5.27	-1.122	0.343
Jeju Air	69.63	54.92	-14.70	4.11	-3.577	0.070
Spring Airlines	68.45	58.76	-9.68	2.21	-4.363	0.049
AirAsia X	64.10	76.55	12.45	12.14	1.025	0.381
Nok Air	60.56	48.55	-12.00	27.26	-0.440	0.690
Cebu Pacific	79.46	65.41	-14.04	2.54	-5.518	0.012
Gol Airlines	45.01	27.82	-17.18	4.69	-3.661	0.035
Air Berlin	81.43	76.61	-4.81	5.67	-0.849	0.458
Virgin Australia Airlines	69.82	64.47	-5.34	5.03	-1.061	0.367

Activity

In the firm-year observation, total assets in all sample firms increased post-IPO, and as shown in Table 7, the asset turnover showed a decreasing tendency in 11 samples. Among those 11 samples, statistical significance was observed in eight of them. Asset turnover decreased by 85.48%, 68.22%, 18.77%, 128.58%, 147.10%, 5.23%, 110.13%, and 72.38% for Spirit Airlines, Jeju Air, Spring Airlines, AirAsia X, Nok Air, Cebu Pacific, Gol Airlines and Virgin Australia Airlines, respectively.

The decrease in asset turnover (activity index) was interpreted as a temporary phenomenon caused by the drastic investment in new equipment compared to indices such as sales and route expansion, which increase when an airline secures a large amount of funds via listing. It is expected that this activity improves in the long-term, as with profitability.

Company	Mean Pre-IPO	Mean Post-IPO	Mean Difference	Standard Deviation	T value	P value
JetBlue	47.56	45.17	-2.38	1.15	-2.071	0.130
Spirit Airlines	164.22	136.89	-85.49	1.35	-63.309	0.000
Virgin America	203.24	123.24	-79.99	44.55	-1.795	0.324
WestJet Airlines	115.89	104.00	-11.88	16.62	-0.715	0.526
Jeju Air	193.66	125.43	-68.22	1.84	-36.939	0.001
Spring Airlines	64.94	46.16	-18.77	4.55	-4.122	0.054
AirAsia X	203.82	75.23	-128.58	15.19	-8.460	0.003
Nok Air	366.76	219.65	-147.10	55.21	-2.664	0.076
Cebu Pacific	65.99	60.75	-5.23	2.00	-2.612	0.080
Gol Airlines	204.46	94.32	-110.13	20.87	-5.276	0.013
Air Berlin	105.97	119.14	13.17	24.60	0.535	0.630
Virgin Australia Airlines	150.00	77.61	-72.38	23.01	-3.145	0.051

Operational Performance

Yield

Yield, which is the operational performance index showing the profitability of an airline, refers to the revenue per load factor and is an index used to see how much revenue is realized by dividing the transportation revenue with revenue passenger kilometers (revenue ton-kilometers). It is the unit revenue of an airline to earn when transporting one passenger for one kilometer. In this study, it was compared for the airlines in the sample that had disclosed their operational performance.³ As shown in Table 8, the yield only increased for two airlines after their IPOs. Spirit Airlines showed a significant increase of 1.89 after its IPO.

Company	Mean Pre-IPO	Mean Post-IPO	Mean Difference	Standard Deviation	T value	P value
JetBlue	9.4600	8.2875	-1.1725	0.6001	-1.954	0.146
Spirit Airlines	11.7200	13.6125	1.8925	0.1905	9.936	0.002
Virgin America	13.1400	13.1250	-0.0150	0.1126	-0.133	0.916
WestJet Airlines	19.6000	21.7750	2.1750	1.4358	1.515	0.227
Nok Air	3.1900	2.5025	-0.6875	0.3867	-1.778	0.173
Cebu Pacific	3.3000	3.2375	-0.0625	0.0594	-1.052	0.370

Load factor

The load factor is the percentage of revenue passenger kilometers of the available seat kilometers sold and is an index related to profitability in terms of the seat occupancy. As shown in Table 9, the load factor increased for five airlines and was statistically significant in four enterprises. The load factor increased by 5.9750, 3.9250, 2.0500, and 6.6500 for JetBlue, Spirit Airlines, Virgin America, and Cebu Pacific, respectively.

Company	Mean Pre-IPO	Mean Post-IPO	Mean Difference	Standard Deviation	T value	P value
JetBlue	78.0000	83.9750	5.9750	1.1775	5.074	0.015
Spirit Airlines	82.1000	86.0250	3.9250	0.8285	4.737	0.018
Virgin America	80.2000	82.2500	2.0500	0.0866	23.671	0.027
WestJet Airlines	71.6000	74.1000	2.5000	1.9170	1.304	0.283
Nok Air	84.2000	83.6125	-0.5875	1.7757	-0.331	0.763
Cebu Pacific	77.4000	84.0500	6.6500	2.3814	2.793	0.068

ASK

ASK is an index related to transport capacity and supply. It represents the transportation capacity targeted to passengers only. As shown in Table 10, the transportation capacity increased in all samples after the IPOs, but it was only statistically significant for one enterprise. The ASK

for Nok Air increased by 2610.25 from 2916 before the IPO to 5526.25 after the IPO, which is interpreted as the result of increasing the supply capacity via the increase in aircraft investment.

Company	Mean Pre-IPO	Mean Post-IPO	Mean Difference	Standard Deviation	T value	P value
JetBlue	4208267.0000	16123369.2500	11915102.2500	7459337.7215	1.597	0.208
Spirit Airlines	8119923.0000	12179634.2500	4059711.2500	2536324.3044	1.601	0.208
Virgin America	12243.0000	12465.5000	222.5000	390.5775	0.570	0.670
WestJet Airlines	893008646.0000	2700671630.0000	1807662984.0000	1661730997.0737	1.088	0.356
Nok Air	2916.0000	5526.2500	2610.2500	1057.4212	2.469	0.090
Cebu Pacific	9369.0000	13282.0000	3913.0000	2784.6667	1.405	0.255

RPK

RPK is an index related to transportation or sales. It is the sum of loaded weight multiplied by distance traveled by the section of air travel, and it is the traffic volume of the airline. As shown in Table 11, in all samples, the average RPK increased after the IPO, indicating that traffic volume had increased. It was statistically significant in two samples. RPK increased to 3.92500 for Spirit Airlines and 2167.50000 for Nok Air, which is deemed to be a result similar to that for ASK.

Company	Mean Pre-IPO	Mean Post-IPO	Mean Difference	Standard Deviation	T value	P value
JetBlue	3281835.0000	13573268.7500	10291433.7500	6394884.2917	1.609	0.206
Spirit Airlines	82.1000	86.0250	3.9250	0.8285	4.737	0.018
Virgin America	80.2000	82.2500	441.0000	313.5012	1.407	0.393
WestJet Airlines	639157206.0000	1999781170.5000	1360623964.5000	1213980355.3041	1.121	0.344
Nok Air	2456.0000	4623.5000	2167.5000	921.9954	2.351	0.100
Cebu Pacific	7056.0000	10962.7500	3906.7500	1913.9215	2.041	0.134

DISCUSSION AND CONCLUSION

In this study, the financial and operational performance of LCCs pre- and post-IPO were compared and analyzed. According to the results, the current ratio increased and the debt ratio decreased in most of the sample enterprises. This indicates that the LCCs raised large amounts of funding through public offerings and carried out visible efforts for improvement, using the money for activities such as debt retirement. Although consistent results were not shown, profitability has declined in some airline companies. This may be consistent with the results demonstrated in numerous previous studies (Mikkelsen et al., 1997; Jain and Kini, 1994 & 1995; Wang et al., 2003; Cai & Wei, 1997; Wang, 2005). Performance decline post-IPO may be due to increased agency costs (Jensen & Meckling, 1976; Jain & Kini, 1994) or accounting data manipulation pre-IPO to attract potential investors (Laughran & Ritter, 1995). Management

performance tends to decrease temporarily after an IPO. Ritter (1991) pointed out that this occurred because a listed enterprise would try to abuse the IPO, or the investor would be overly optimistic about the potential profits. That is, the results can be interpreted as revealing that enterprises often overestimate themselves when raising funds via the IPO, or they are not able to efficiently carry out profitable improvement activities because they cannot select appropriate investment targets.

Immediately after the IPOs, asset turnover decreased for various enterprises, suggesting that the decrease in net sales to asset ratios was a temporary phenomenon caused by rapidly investing the funds raised by the IPO in areas such as aircraft purchases. In the long-term, it is expected the asset turnover would improve. With respect to operational performance, the load factor (seat occupancy), ASK (transportation capacity), and RPK (transportation volume or sales volume) increased in most of the sample enterprises for which data were available.

Via its IPO, Jeju Air in Korea reduced its operating costs and maintenance and repair costs incurred in the operating lease structure. At the same time, it improved equipment efficiency, maintenance, and operational safety by purchasing three airplanes. It acquired the aircraft engine assets and introduced a flight simulator (Jeju Air Investor Relations, 2016). According to IR data related to the 2018 Jeju Air's Investor Presentation regarding the New Facilities Investment Disclosure, it was concluded that the airline would purchase 50 brand new Boeing 737 Max aircraft. However, out of the sample enterprises, Air Berlin, which is the second-ranked airline in Germany and was ranked in the top seven in Europe, went bankrupt in August, 2017. This was the second bankruptcy in as many years Alitalia, the national airline of Italy, declared bankruptcy in May 2016. These bankruptcies occurred because profitability had plummeted as air ticket prices dropped sharply due to the fierce competition among LCCs. Strategies and endeavors for sustainable growth should follow an IPO.

In the Korean aviation market, new competitors such as Aero K, Air Premia, Fly Gangwon and Air Philip entered in March 2019, and IFRS 16 (the set of new accounting standards) were introduced. For airlines, these two phenomena emphasize that securing competitiveness is essential, and this can be done through servicing diverse routes and purchasing new aircraft. Here, IPOs play a critical role in smooth fundraising. There are many similar studies of this nature. But there have not been many empirical studies on lower cost carriers (LCCs). By expanding previous research, this study added further contributions to this line of studies by focusing on characteristics of airline industry, more specifically on LCCs. Besides, this study can be differentiated from similar studies in that it examined airline industry specific indicators such as Yield, Load Factor, ASK, and RPK. This study is limited in that the number of samples is small due to the difficulty in collecting data. Therefore, this analysis may lack in sophistication. The results were not consistent. Nevertheless, the comparison of pre- and post-IPO performance of 12 global LCCs in various countries are deemed to be useful for the industry and valuable as a basis for future research. We argue that more research is needed on the diverse characteristics of LCCs with more samples sufficient for the effect of IPO to take place in different firm performance indicators. Due to data limitations, this study could not address the determinants of IPOs and post-IPO performance change. Future research that can look into those more theoretically is also suggested.

ENDNOTE

1. Joint analysis by Chosun Ilbo, Samsung Securities, and Fn Guide. 2018.4

2. According to information disclosed by ICAO (International Civil Aviation Organization), worldwide number of LCCs is 133. This study depended on information provided by each company, there was a difficulty in data collection, and therefore there are limitations in number of sample firms and the sample period.
3. Because the access to information for operational performance was difficult to obtain, the information for only six airlines could be collected.

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