TWU SMIF
Student Managed Investment Fund

The US Airline Industry

A detailed look at the four major US airlines

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For TWU SMIF

Introduction to the Airline Industry

The airline industry is an integral part of the US economy. From shuttling business people to and from meetings, to connecting families, to ferrying mail and urgent packages faster and more efficiently than any truck could do, US airlines permeate the American economy in a big way. As household wealth increases[1] and airline travel increases in frequency,[2] the industry is poised to bring in increasing revenues, albeit far from the double-digits of other notable, fast paced industries such as electric vehicles or technology startups. As technology around the world and in the airline industry gets better and better however, we will see more of that revenue being retained as profit, as plane manufacturers build hyper-fuel-efficient planes, and airlines seek out ways to increase margins.[3] [4]

Opportunities in the Airline Industry

As far as opportunities go for the airline industry, one of the biggest and most talked about is the tax cuts being implemented in the US right now. They will further increase the margins of airlines and possibly offer incentive to grow operations. Oil prices also continue to remain low, and even though they are expected to rise in the short term, airlines can take advantage of the "breather" they have right now to spend money on efficient planes and growing their business. Finally, the consumer confidence index remains near all-time highs, which should mean greater discretionary expenditure by families on vacations.

Risks in the Airline Industry

On the other side, there are a few risks for the airline industry. To follow up with the pros of the tax reform, the adverse effects of the tax cuts on low-income families and even average-income households is as yet unknown. These two demographics are arguably the largest source of growth for passengers available to airlines, and so a decrease in discretionary wealth or confidence may negatively impact the airlines.

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[1] https://www.bloomberg.com/news/articles/2017-12-07/u-s-household-wealth-hits-record-96-9-trillion-last-quarter

[2] https://www.airspacemag.com/daily-planet/how-much-worlds-population-has-flown-airplane-180957719/

[3] http://www.businessinsider.com/airbus-boeing-sales-war-dubai-2017-11

[4] https://www.technologyreview.com/s/601008/the-race-for-the-ultra-efficient-jet-engine-of-the-future/

Another risk is the introduction of ultra-low-cost airlines into the domestic and international market. New companies are springing up, trying to challenge the status-quo of airlines pricing and conventions by offering dirt-cheap, no-frills transportation to those travelling on a budget. The introduction of an independent company in this segment, or even a competitor starting a regional airline competitor could quickly take away business and market share from other airlines.

Comparison of the Four Major Airlines

Southwest Airlines, with its domestically-focused flights, easily has the most comfortable operating margin of any of the four airlines. This is probably due to shorter flights on average and thus less fuel, less food for customers, and less advertising needed. With a fleet size of more than 700 planes and only 100 destinations, they are able to offer flights at all hours of the day to cater towards those travelling for business or on tight time schedules.

United Airlines has around 750 planes, but services approximately 325 destinations all around the world. This increased area of concentration means fewer flights, but also longer flights as the fly all around the world. They must expend the fuel necessary to fly to far-flung destinations, but must also pay a crew that is either bilingual, or can work well in countries where social dynamics and culture may be very different. Having flight attendants with multiple languages would be difficult and costly. It is no surprise that of the four major airlines, United has the smallest operating margins. It is worth noting that United has received several bouts of bad PR, and could be suffering because of that.

American Airlines only has a small leg up on United though, with operating margins just breaking the 12% mark and revenues about $5 billion greater. Where American falters in margin, it makes up for in service availability and fleet size. They maintain a fleet of around 950 planes which is the largest of the big four and service around 350 destinations, again, a high among the four major airlines.

	American Airlines	Delta Airlines	Southwest Airlines	United Airlines
Planes	947	850	712	746
Destinations	350	306	100	342

Revenue per Region of the Four Major Airlines

For both American and Delta, domestic service makes up around 70% of total revenue from flights. Delta flies a lot more across the Atlantic to Europe than American does, with those trips making up about 15% of total revenue from flights and American flies much more across Mexico Latin America than Delta, with about 12.5% of their revenue coming from those routes. United only brings in 60% of their total revenue from flights from domestic trips. Their trips across the Atlantic bring in around 17% of their revenue, and trips across the Pacific to Asia account for 13.5% of total revenue from flights. With increasing middle-classes in Asia and to some extent in Latin America, United could definitely see some benefit to targeting Asia. Whether this is their strategy or simply how their revenue happened to be after factoring in demand, it is unclear.

	American Airlines	Delta Airlines	Southwest Airlines	United Airlines
Mainline	$27,909.00	$28,105.00	N/A	$25,414.00
As % of Rev	80.7108%	83.2075%		80.7896%
Regional	$6,670.00	$5,672.00	N/A	$6,043.00
As % of Rev	19.2892%	16.7925%		19.2104%
Domestic	$28,620.00	$23,604.00	N/A	$22,202.00
As % of Rev	71.2295%	69.8819%		60.7342%
Latin America	$4,995.00	$2,372.00	N/A	$3,238.00
As % of Rev	12.4316%	7.0225%		8.8576%
Atlantic	$4,769.00	$5,185.00	N/A	$6,157.00
As % of Rev	11.8691%	15.3507%		16.8427%
Pacific	$1,796.00	$2,616.00	N/A	$4,959.00
As % of Rev	4.4699%	7.7449%		13.5655%

Debt among the Four Major Airlines

In the airline industry, heavy debt is a part of doing business, and buying new planes worth millions of dollars is necessary to stay relevant and to take advantage of new technologies. That being said, even in a debt-heavy industry, companies can lose sight on their debt and let it get out of hand. American airlines easily has the highest amount of debt per dollar of equity, and seems less prepared than other airlines in terms of their debt coverage. The other three airlines have debt/equity ratios in the range of 2 to 5, which are more normal. Southwest also operates with a debt coverage ratio of 60:1, which is the largest in the industry and is a possible sign of inefficient allocation of resources.

The industry average market debt to capital ratio is approximately 29%. Delta Airlines comes close with a ratio of 20%, but the other three major airlines vary wildly.

American and United have the highest debt to capital ratios at 52% and 43% respectively, which are way above industry average. Southwest comes in way under industry average with a ratio of around 9%. This again indicates a possibility of inefficient use of capital by Southwest, while American and United may be over-leveraged.

When it comes to the benefit derived by the debt these companies have on their balance sheet, one may expect a high return on debt because more airplanes should mean more money, but this is not always the case. In fact, in running a regression with debt as the independent variable and net income as the dependent variable, only American and Delta had positive returns on debt. Southwest appeared to suffer more the greater amount for debt they took on to an alarming degree, while United only had a return of about -8%. It should be noted that these numbers are using only the last years' data, and does not provide a very long term view of the situation.

When it comes to the return generated from the airlines' assets, they were all positive and clustered fairly well together in the 3.6% to 6.6% range, with the slight exception of Southwest, who earned a 14% return on assets.

	American Airlines	Delta Airlines	Southwest Airlines	United Airlines
Debt/Equity	12.273	2.709	1.756	3.745
Debt Coverage	4.041	15.264	58.293	7.171
ROA	3.6615%	6.6828%	14.4274%	4.5370%
ROD	18.02%	27.76%	-137.62%	-8.66%
[R Square]	17.4857%	54.0343%	8.9777%	20.7132%
Debt/Capital	52.4274%	20.3297%	8.9232%	43.1647%

DCF Valuations

Inputs for all of the DCF valuations were kept conservative, with exception given only marginally to companies who had proven track records of good performance. Instead of going through every individual input, the raw inputs for each valuation scenario will be included below, and the 10-year outlook for determining present and terminal value will be included in the appendices.

American Airlines DCF Inputs			
Value Drivers	Base Case	Best Case	Worst Case
Revenue Growth:	3.0000%	4.0000%	0.0000%
Operating Margin Year 10:	9.6145%	16.3090%	10.0000%
Sales to capital ratio(start):	1.88	1.88	1.88
Sales to capital ratio(end):	1.42	2.00	1.25

Delta Airlines DCF Inputs			
Value Drivers	Base Case	Best Case	Worst Case
Revenue Growth:	1.6366%	2.3708%	1.0000%
Operating Margin Year 10:	14.2192%	16.3090%	13.0000%
Sales to capital ratio(start):	2.02	2.02	2.02
Sales to capital ratio(end):	1.42	2.00	1.25

Southwest Airlines DCF Inputs			
Value Drivers	Base Case	Best Case	Worst Case
Revenue Growth:	3.5421%	4.5886%	2.3300%
Operating Margin Year 10:	16.3090%	16.2432%	15.0000%
Sales to capital ratio(start):	2.37	2.37	2.37
Sales to capital ratio(end):	1.42	2.40	1.25

United Continental Airlines DCF Inputs			
Value Drivers	Base Case	Best Case	Worst Case
Revenue Growth:	-1.4984%	2.3300%	-2.3300%
Operating Margin Year 10:	16.3090%	18.0000%	12.3347%
Sales to capital ratio(start):	2.01	2.01	2.01
Sales to capital ratio(end):	1.42	2.20	1.25

Final Valuation Outputs and Recommendations

Overall, it appears as though the airline industry is undervalued in general, and that appears especially so for the major four airlines. Using a weighted average with half the weight going to the base case and 25 points to each worst and best case saw reasonable price targets well below market value. It should be noted that recent turmoil in the markets have seen prices drop and jump by as much as $10, and in volatility, it may be helpful to buy sooner rather than later, as the market may look for safety and correct on these shares.

	American Airlines	Delta Airlines	Southwest Airlines	United Airlines
Worst	$57.93	$60.01	$70.69	$65.64
As %	93%	94%	82%	98%
Base	$63.90	$67.18	$79.41	$95.76
As %	84%	84%	73%	67%
Best	$138.93	$79.79	$84.07	$135.77
As %	39%	71%	69%	47%
Average	$86.92	$68.99	$78.06	$99.05
As %	61.99%	81.75%	74.22%	64.61%
W/ Average	$81.16	$68.54	$78.40	$98.23
As %	66.38%	82.29%	73.90%	65.15%
Market	$53.88	$56.40	$57.94	$64.00

The recommendations take into account not only the DCF valuation, but also the debt standings and overall health of the companies. Taking everything into account, even though all the stocks are undervalued, not all are solid buys. American Airlines receives a buy rating with a price target of $81.16, Delta Airlines receives a strong buy rating with a price target of $68.54, Southwest Airlines receives a buy with a price target of $78.40, and United receives a hold rating with a recommendation to place it on the watch list, as well as a price target of $98.23.

APPENDIX 1: American Airlines Base Case DCF Valuation

	Base year	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	Terminal year
Revenue growth%		3.00%	3.00%	3.00%	3.00%	3.00%	2.87%	2.73%	2.60%	2.46%	2.33%	2.33%
Revenues	$42,207	$43,473	$44,777	$46,121	$47,504	$48,929	$50,332	$51,707	$53,050	$54,357	$55,624	$56,920
Operating margin	9.61%	9.61%	9.61%	9.61%	9.61%	9.61%	9.61%	9.61%	9.61%	9.61%	9.61%	9.61%
EBIT (Operating income)	$4,137	$4,180	$4,305	$4,434	$4,567	$4,704	$4,839	$4,971	$5,101	$5,226	$5,348	$5,473
Tax rate	37.80%	37.80%	37.80%	37.80%	37.80%	37.80%	34.44%	31.08%	27.72%	24.36%	21.00%	21.00%
EBIT(1-t)	$2,573	$2,600	$2,678	$2,758	$2,841	$2,926	$3,173	$3,426	$3,687	$3,953	$4,225	$4,323
- Reinvestment	$1,369	$691	$730	$771	$816	$864	$874	$882	$888	$891	$891	$1,677
FCFF	$3,942	$1,909	$1,948	$1,987	$2,025	$2,063	$2,299	$2,544	$2,799	$3,062	$3,334	$2,647
Terminal Value											$58,811	

Cost of capital (WACC)		6.01%	6.01%	6.01%	6.01%	6.01%	6.17%	6.34%	6.50%	6.67%	6.83%	6.83%
Cumulated discount factor		0.9433	0.8899	0.8394	0.7919	0.7470	0.7036	0.6616	0.6213	0.5824	0.5452	
PV(FCFF)		$1,801	$1,734	$1,668	$1,604	$1,541	$1,617	$1,683	$1,739	$1,784	$33,882	

<u>*Implied variables*</u>												After year 10
Sales to capital ratio	1.88	1.83	1.79	1.74	1.70	1.65	1.60	1.56	1.51	1.47	1.42	
Invested capital	$22,471.00	$23,162	$23,892	$24,663	$25,479	$26,343	$27,217	$28,099	$28,987	$29,878	$30,769	
ROIC	11.45%	11.23%	11.21%	11.18%	11.15%	11.11%	11.66%	12.19%	12.72%	13.23%	13.73%	6.01%

Sum of PV(FCFF)	$49,051
Probability of failure =	0.00%
Proceeds if firm fails =	$24,526
Value of operating assets =	$49,051
- Debt	$24,684
+ Cash & MKt Securities	$6,161
Value of equity	$30,528
Number of shares	477.78
Estimated value /share	$63.90

APPENDIX 2: Delta Airlines Base Case DCF Valuation

	Base year	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	Terminal year
Revenue growth%		1.64%	1.64%	1.64%	1.64%	1.64%	1.78%	1.91%	2.05%	2.19%	2.33%	2.33%
Revenues	$41,233	$41,908	$42,594	$43,291	$43,999	$44,719	$45,513	$46,384	$47,336	$48,374	$49,501	$50,654
Operating margin	14.22%	14.22%	14.22%	14.22%	14.22%	14.22%	14.22%	14.22%	14.22%	14.22%	14.22%	14.22%
EBIT (Operating income)	$6,096	$5,959	$6,056	$6,156	$6,256	$6,359	$6,472	$6,595	$6,731	$6,878	$7,039	$7,203
Tax rate	37.25%	37.25%	37.25%	37.25%	37.25%	37.25%	36.80%	36.35%	35.90%	35.45%	35.00%	35.00%
EBIT(1-t)	$3,826	$3,740	$3,801	$3,863	$3,926	$3,990	$4,090	$4,198	$4,315	$4,440	$4,575	$4,682
- Reinvestment	$941	$344	$360	$378	$397	$418	$478	$544	$617	$700	$793	$996
FCFF	$6,927	$3,396	$3,440	$3,485	$3,529	$3,572	$3,613	$3,655	$3,697	$3,740	$3,782	$3,686
Terminal Value											$81,913	

Cost of capital (WACC)		10.96%	10.96%	10.96%	10.96%	10.96%	10.13%	9.31%	8.48%	7.66%	6.83%	6.83%
Cumulated discount factor		0.9013	0.8123	0.7321	0.6598	0.5946	0.5399	0.4939	0.4553	0.4230	0.3959	
PV(FCFF)		$3,061	$2,795	$2,551	$2,328	$2,124	$1,951	$1,805	$1,683	$1,582	$33,928	

Implied variables												After year 10
Sales to capital ratio	2.02	1.96	1.90	1.84	1.78	1.72	1.66	1.60	1.54	1.48	1.42	
Invested capital	$20,371.00	$20,715	$21,075	$21,453	$21,850	$22,268	$22,746	$23,290	$23,907	$24,607	$25,400	
ROIC	18.78%	18.05%	18.03%	18.01%	17.97%	17.92%	17.98%	18.03%	18.05%	18.04%	18.01%	10.96%

Sum of PV(FCFF)	$53,808
Probability of failure =	0.00%
Proceeds if firm fails =	$26,904
Value of operating assets =	$53,808
- Debt	$8,808
+ Cash & MKt Securities	$2,438
Value of equity	$47,438
Number of shares	706.17
Estimated value /share	$67.18

APPENDIX 3: Southwest Airlines Base Case DCF Valuation

	Base year	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	Terminal year
Revenue growth%		3.54%	3.54%	3.54%	3.54%	3.54%	3.30%	3.06%	2.81%	2.57%	2.33%	2.33%
Revenues	$21,172	$21,922	$22,698	$23,502	$24,335	$25,197	$26,028	$26,824	$27,579	$28,288	$28,948	$29,622
Operating margin	16.24%	16.25%	16.26%	16.26%	16.27%	16.28%	16.28%	16.29%	16.30%	16.30%	16.31%	16.31%
EBIT (Operating income)	$3,310	$3,562	$3,690	$3,822	$3,959	$4,101	$4,238	$4,369	$4,494	$4,612	$4,721	$4,831
Tax rate	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.00%	14.00%	21.00%	28.00%	35.00%	35.00%
EBIT(1-t)	$3,310	$3,562	$3,690	$3,822	$3,959	$4,101	$3,941	$3,758	$3,550	$3,320	$3,069	$3,140
- Reinvestment	$654	$330	$356	$386	$418	$455	$462	$466	$469	$468	$464	$1,105
FCFF	$5,423	$3,233	$3,334	$3,437	$3,541	$3,646	$3,480	$3,291	$3,082	$2,853	$2,605	$2,035
Terminal Value											$45,232	

Cost of capital (WACC)		6.62%	6.62%	6.62%	6.62%	6.62%	6.66%	6.71%	6.75%	6.79%	6.83%	6.83%
Cumulated discount factor		0.9379	0.8796	0.8250	0.7737	0.7257	0.6803	0.6376	0.5973	0.5593	0.5236	
PV(FCFF)		$3,032	$2,932	$2,835	$2,740	$2,646	$2,367	$2,098	$1,841	$1,595	$25,046	

Implied variables												After year 10
Sales to capital ratio	2.37	2.28	2.18	2.09	1.99	1.90	1.80	1.71	1.61	1.52	1.42	
Invested capital	$8,933.00	$9,263	$9,619	$10,004	$10,422	$10,877	$11,339	$11,805	$12,274	$12,742	$13,205	
ROIC	37.05%	38.46%	38.36%	38.21%	37.99%	37.70%	34.76%	31.83%	28.93%	26.06%	23.24%	6.62%

Sum of PV(FCFF)	$47,133
Probability of failure =	0.00%
Proceeds if firm fails =	$23,567
Value of operating assets =	$47,133
- Debt	$3,173
+ Cash & MKt Securities	$3,040
Value of equity	$47,000
Number of shares	591.85
Estimated value /share	$79.41

APPENDIX 4: United Continental Base Case DCF Valuation

	Base year	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	Terminal year
Revenue growth%		-1.50%	-1.50%	-1.50%	-1.50%	-1.50%	-0.73%	0.03%	0.80%	1.56%	2.33%	2.33%
Revenues	$37,350	$36,790	$36,239	$35,696	$35,161	$34,634	$34,381	$34,392	$34,666	$35,209	$36,029	$36,869
Operating margin	12.33%	12.73%	13.13%	13.53%	13.92%	14.32%	14.72%	15.12%	15.51%	15.91%	16.31%	16.31%
EBIT (Operating income)	$3,815	$4,684	$4,758	$4,829	$4,896	$4,960	$5,061	$5,199	$5,378	$5,602	$5,876	$6,013
Tax rate	40.66%	40.66%	40.66%	40.66%	40.66%	40.66%	39.53%	38.40%	37.27%	36.13%	35.00%	35.00%
EBIT(1-t)	$2,264	$2,779	$2,823	$2,865	$2,905	$2,943	$3,060	$3,203	$3,374	$3,578	$3,819	$3,908
- Reinvestment	$1,120	$(287)	$(291)	$(296)	$(301)	$(307)	$(153)	$7	$178	$366	$577	$619
FCFF	$3,384	$2,779	$2,823	$2,865	$2,905	$2,943	$3,060	$3,196	$3,196	$3,212	$3,242	$3,290
Terminal Value											$73,106	

Cost of capital (WACC)		14.72%	14.72%	14.72%	14.72%	14.72%	13.14%	11.56%	9.99%	8.41%	6.83%	6.83%
Cumulated discount factor		0.8717	0.7598	0.6623	0.5773	0.5032	0.4448	0.3987	0.3625	0.3344	0.3130	
PV(FCFF)		$2,423	$2,145	$1,898	$1,677	$1,481	$1,361	$1,274	$1,158	$1,074	$23,896	

Implied variables												After year 10
Sales to capital ratio	2.01	1.95	1.89	1.83	1.77	1.72	1.66	1.60	1.54	1.48	1.42	
Invested capital	$18,585.00	$18,298	$18,007	$17,711	$17,409	$17,102	$16,949	$16,956	$17,134	$17,501	$18,078	
ROIC	12.18%	15.19%	15.68%	16.18%	16.69%	17.21%	18.05%	18.89%	19.69%	20.44%	21.13%	14.72%

Sum of PV(FCFF)	$38,388
Probability of failure =	0.00%
Proceeds if firm fails =	$19,194
Value of operating assets =	$38,388
- Debt	$13,943
+ Cash & MKt Securities	$4,328
Value of equity	$28,773
Number of shares	300.47
Estimated value /share	$95.76