The Economic Impact of the Downgrade of the Air Safety Rating: Evidence for Malaysia

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Organization

Introduction

The Importance of Air Transport to the World

35%

OF THE VALUE OF WORLD TRADE

4.3 billion

PASSENGERS CHOOSE AIR TRANSPORT ON SCHEDULED SERVICES IN 2018.

The Importance of Air Transport to Malaysia

3.5%

GDP TRANSPORT & FOREIGN TOURISTS ARRIVING BY AIR

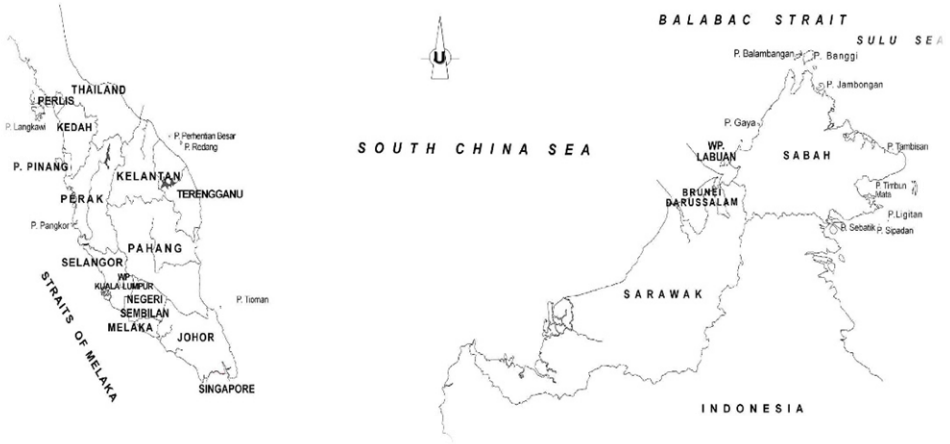
$10.3 billion

GROSS VALUE ADDED CONTRIBUTION TO GDP

65%

SUPPORTED BY THE JOBS AIR TRANSPORT SECTOR

Issue



- There are several countries that their air safety rating have been downgraded such as Philippines, Indonesia, Thailand, India and Mexico. All of these countries are being imposed sanction where they are not allowed to expand and add new routes to the United States.

- To make matters worse, it also led to sanctions by the European Union (EU), where the downgraded countries are not allowed to enter the EU airspace. The situation undoubtedly cause disruptions in the supply of the air transport industry.

- On the 11th November 2019, Federal Aviation Administration (FAA) downgrades Malaysia aviation's safety to category 2 as Civil Aviation Authority of Malaysia (CAAM) do not meet the safety standards of the International Civil Aviation Organization (ICAO).

- Consequently, Malaysia's carriers can only continue with its existing service to the United States but they are not allowed to establish new service to the United States.

Objectives

Objective

This study aims to highlight:

1. The importance of the air transport industry to the economy

2. The impact of air safety downgrade to each sector and Malaysian economy as a whole.

Literature Review

Literature Reviews

The air transport industry is very important to the economy of a country. There are many previous studies which show the **importance** of the air transport industry on the economy

- Sulaiman and Fauzi (2017) - used input-output analysis found that the service sector such as air transport sub-sectors has a greater linkage in employment. Meaning that aviation sector has a larger potential in generating employment compared to manufacturing and agricultural sectors.

- Soulie and Valle (2014) - used input-output analysis to show a strong relationship between air transport and the tourism industry.

- Munjal (2013) - proved the development of the air transport industry are beneficial to the tourism industry

Literature Review

There are few studies that investigates the economic **impacts of air safety downgrade.**

- Manuela and de Vera (2015) - The FAA downgrade and followed by EU ban had negative impact on tourism receipts in the short term where it decreases monthly tourism receipts, by USD 28.28 million and USD 13.68 million respectively. This is mostly due to the cancelations of travel and tours in the Philippines following the downgrade and ban.

- Manuela and de Vera (2015) – The downgrade impacts tourism receipts negatively in the long term. This is due to the inability of the Philippine Airlines (PAL), the flag carrier of the country, to expand to North American route network, implying that the economic loss due to the decline extends beyond the tourism industry.

Literature Review

There are few studies that investigates the economic **impacts of air safety downgrade.**

- Henderson (2008) – The downgrade has also led to EU sanctions on Indonesia. As a result, the decline of internal air travelers, resulting in at least a fluctuation of USD 9 million in European ticket sales in the year following the ban. It was even more anxious about its sullied reputation for Garuda airlines and cancellations by Japanese tour groups in mid-2007 and of a downturn in tourism on Lombok by the end of the year.

Data and Methodology

Data and Methodology

- This research analyses the input-output table based on the well established Input Output model developed by Leontief (1951). It has been proven to be a good research methodology to establish the importance and the sectoral linkages of transportation sectors (Kwak et al., 2005).

- **First part of our analysis** - this research explores the importance of air transport sectors production on other sectors by looking into the backward linkages and forward linkages.

- The backward linkage effect means that the economic activities of the air transport sector uses other sectors as an input for production.

- The forward linkage effect indicates that the output from air transport production is used as an input for other sectors' production. This study analyses 124 sectors from 2010 and 2015 Malaysia Input Output dataset. To have a detailed and comprehensive sectoral analysis, we had aggregated base data into 46 sectors.

Data and Methodology

- **The second part of our analysis** - that is to investigate the impacts of air safety downgrade which focuses on the 2015 input output data as it reflects the current technological coefficients.

- We impose 15% reduction rate in value added for the air transport industry to simulate the potential impacts of air safety downgrade on the output and value added of other sectors in Malaysia's economy.

- Manuela and de Vera (2015) shows that air safety downgrade leads to reduction in tourism contributions to GDP by 14% to 16%.

- There are no existing research for the case of Malaysia, thus we utilize Manuela and de Vera (2015) results and shocks value added in air transport sector by the average rate, 15%.

Results

Results

- We used 2010 and 2015 Malaysia input output table to calculate the backward and forward linkages as shown in Table 2 and 3.

- The linkage results show that air transport had index value higher than 1 for its backward and forward linkages for the year 2015 and this indicates that the air transport industry is now a ‘key’ industry in Malaysia’s economy.

- Thus, any shocks in air transport industry will definitely have an impact on Malaysia’s economy as a whole.

Table 2: Backward Linkages

Sector	2010		2015	
	Value	Rank	Value	Rank
Agriculture products and others	0.718	45	0.730	42
Rubber planting	0.888	34	0.728	43
Oil palm estates	0.761	43	0.710	45
Livestock farming	1.027	20	1.012	27
Forestry and logging	1.212	4	0.763	41
Fishing	1.052	19	0.724	44
Crude oil and natural gas	0.684	46	0.700	46
Mining and quarrying	0.762	42	1.074	14
Food and beverage	1.076	14	1.118	9
Oil and fats	1.525	1	1.416	1
Animal feeds	1.063	17	1.286	2
Tobacco	0.781	39	0.773	40
Textile	1.053	18	0.904	35
Clothing	0.911	29	0.991	30
Leather and footwear	1.001	23	1.040	20
Wood product	1.435	2	1.161	7
Furniture and paper products	1.195	6	1.167	5
Publishing and printing	0.991	24	1.016	25
Petroleum refinery	0.988	25	1.047	18
Chemical products and others	1.137	10	1.093	13
Drugs and medical product	0.808	38	0.971	32
Processed rubber and rubber products	1.404	3	1.093	12
Plastic Products	1.108	13	1.007	28
Non-metallic mineral products	1.207	5	1.200	3
Basic metal	1.010	21	1.120	8
Fabricated metal products	1.009	22	1.018	23
Industrial machinery and equipment	0.903	31	1.042	19
Household machinery and equipment	0.777	41	0.991	29
Household electric appliance and apparatus	0.778	40	1.021	22
Precision equipment	0.854	37	1.014	26
Motor vehicle	0.929	27	1.072	15
Other transport equipment	1.180	7	1.071	16
Other manufacturing products	0.898	32	1.060	17
Electricity, gas, and waterworks	0.888	35	0.942	34
Building and construction	1.135	11	1.162	6
Wholesale and retail trade	0.905	30	0.892	36
Hotels and restaurants	1.157	9	1.104	10
Other Transportation services	1.069	15	1.030	21
Air Transport	**1.161**	**8**	**1.186**	**4**
Postal and telecommunication services	1.133	12	1.017	24
Financial services	1.063	16	0.846	38
Real estate and ownership of dwellings	0.919	28	0.790	39
Business services	0.893	33	0.951	33
Education services	0.735	44	0.870	37
Healthcare services	0.873	36	1.099	11
Other services	0.944	26	0.975	31

Table 3: Forward Linkages

Sector	2010		2015	
	Value	Rank	Value	Rank
Agriculture products and others	0.900	28	0.836	32
Rubber planting	0.783	36	0.697	39
Oil palm estates	1.557	3	1.350	5
Livestock farming	0.675	39	0.927	24
Forestry and logging	1.599	1	1.372	3
Fishing	0.889	30	0.879	28
Crude oil and natural gas	1.158	13	1.299	8
Mining and quarrying	1.571	2	1.312	7
Food and beverage	0.803	33	0.810	33
Oil and fats	1.017	21	0.888	27
Animal feeds	1.099	17	1.444	1
Tobacco	0.662	42	0.617	45
Textile	0.840	31	0.866	31
Clothing	0.722	38	0.661	43
Leather and footwear	0.934	27	1.044	21
Wood product	1.019	20	0.957	23
Furniture and paper products	0.934	26	0.663	42
Publishing and printing	1.547	4	1.079	20
Petroleum refinery	1.015	22	1.360	4
Chemical products and others	1.114	15	1.133	17
Drugs and medical product	1.102	16	1.427	2
Processed rubber and rubber products	1.115	14	0.975	22
Plastic Products	0.960	25	0.872	30
Non-metallic mineral products	1.346	6	1.338	6
Basic metal	1.214	9	1.259	10
Fabricated metal products	1.091	18	1.281	9
Industrial machinery and equipment	0.789	35	0.805	34
Household machinery and equipment	0.598	45	0.744	38
Household electric appliance and apparatus	0.603	43	0.903	26
Precision equipment	0.666	41	0.769	36
Motor vehicle	0.891	29	1.204	14
Other transport equipment	0.749	37	0.878	29
Other manufacturing products	1.189	11	1.244	12
Electricity, gas, and waterworks	1.338	7	1.253	11
Building and construction	0.793	34	0.772	35
Wholesale and retail trade	0.982	23	1.105	18
Hotels and restaurants	0.838	32	0.758	37
Other Transportation services	1.186	12	1.105	19
Air Transport	**0.964**	**24**	**1.155**	**16**
Postal and telecommunication services	1.199	10	0.917	25
Financial services	1.369	5	1.195	15
Real estate and ownership of dwellings	1.040	19	0.695	40
Business services	1.275	8	1.229	13
Education services	0.595	46	0.585	46
Healthcare services	0.671	40	0.688	41
Other services	0.600	44	0.651	44

Results

- We then proceed to the estimation of the output to primary input multiplier due to changes in air transport sectors as shown in Table 4 from the highest to the lowest.

- Results show that the total multiplier values are equal to 2.05, which indicate that single unit change in primary inputs for air transport sector in Malaysia would change the total output throughout all sectors by 2.05.

- Air transport industry in Malaysia strongly supports the development of tertiary industry, especially other transportation services, wholesale and retail trade, hotels and restaurants, financial services and business services.

Table 4: Output to Primary Input Multiplier of Air Transport Sector for Year 2015

Sector	Industry	Output-Primary Input Multiplier
39	**Air Transport**	**1.027**
46	Other services	0.141
35	Building and construction	0.117
40	Postal and telecommunication services	0.089
43	Business services	0.082
41	Financial services	0.064
10	Oil and fats	0.062
29	Household electric appliance and apparatus	0.055
36	Wholesale and retail trade	0.044
7	Crude oil and natural gas	0.037
19	Petroleum refinery	0.035
37	Hotels and restaurants	0.028
20	Chemical products and others	0.027
45	Healthcare services	0.026
9	Food and beverage	0.024
44	Education services	0.023
38	Other Transportation services	0.016
31	Motor vehicle	0.013
26	Fabricated metal products	0.013
24	Non-metallic mineral products	0.012
25	Basic metal	0.011
16	Wood product	0.010
34	Electricity, gas, and waterworks	0.010
27	Industrial machinery and equipment	0.008
23	Plastic Products	0.008
22	Processed rubber and rubber products	0.007
32	Other transport equipment	0.007
28	Household machinery and equipment	0.007
42	Real estate and ownership of dwellings	0.006
33	Other manufacturing products	0.006
30	Precision equipment	0.005
4	Livestock farming	0.004
17	Furniture and paper products	0.004
3	Oil palm estates	0.004
11	Animal feeds	0.003
1	Agriculture products and others	0.003
8	Mining and quarrying	0.003
18	Publishing and printing	0.003
14	Clothing	0.002
13	Textile	0.002
6	Fishing	0.002
21	Drugs and medical product	0.001
5	Forestry and logging	0.001
12	Tobacco	0.001
15	Leather and footwear	0.001
2	Rubber planting	0.000
	Total	**2.048**

Results

- Reduction by 15 per cent in the value added in air transport industries will result in RM 2.7 billion total output loss
- However, it should be noted that output loss are not equivalent to GDP loss, as some parts of output was contributed by imported commodities.
- Thus, we should look at value added changes to have an overview of potential GDP impact of air safety downgrade.
- Base input output data shows that Malaysia GDP for the year 2015 are RM1.13 trillion and Table 5 shows that GDP are expected to decrease by RM901 million, which equivalent to approximately 0.1% of Malaysia's GDP.

Output and Value-Added Changes due to Exogenous Shocks

Sector	Industry	Output Changes (RM million)	Value Added Changes (RM million)
1	Agriculture products and others	-3.96	-1.84
2	Rubber planting	-0.53	-0.25
3	Oil palm estates	-5.00	-2.38
4	Livestock farming	-5.43	-1.95
5	Forestry and logging	-1.28	-0.58
6	Fishing	-2.11	-1.07
7	Crude oil and natural gas	-49.03	-24.75
8	Mining and quarrying	-3.60	-0.86
9	Food and beverage	-32.57	-4.72
10	Oil and fats	-83.81	-2.98
11	Animal feeds	-4.07	-0.33
12	Tobacco	-0.95	-0.28
13	Textile	-2.16	-0.34
14	Clothing	-2.64	-0.51
15	Leather and footwear	-0.70	-0.13
16	Wood product	-13.46	-1.98
17	Furniture and paper products	-5.05	-0.91
18	Publishing and printing	-3.50	-0.74
19	Petroleum refinery	-46.37	-6.86
20	Chemical products and others	-35.91	-5.99
21	Drugs and medical product	-1.38	-0.30
22	Processed rubber and rubber products	-9.58	-1.20
23	Plastic Products	-10.08	-1.69
24	Non-metallic mineral products	-15.65	-2.41
25	Basic metal	-15.30	-1.75
26	Fabricated metal products	-16.80	-2.73
27	Industrial machinery and equipment	-10.20	-1.51
28	Household machinery and equipment	-8.97	-0.86
29	Household electric appliance and apparatus	-74.53	-9.31
30	Precision equipment	-6.99	-1.15
31	Motor vehicle	-16.90	-2.49
32	Other transport equipment	-9.47	-1.30
33	Other manufacturing products	-8.29	-1.20
34	Electricity, gas, and waterworks	-13.29	-4.10
35	Building and construction	-157.24	-28.48
36	Wholesale and retail trade	-59.20	-21.68
37	Hotels and restaurants	-37.85	-9.94
38	Other Transportation services	-21.64	-5.85
39	Air Transport	-1,379.47	-205.82
40	Postal and telecommunication services	-119.42	-35.28
41	Financial services	-86.59	-33.47
42	Real estate and ownership of dwellings	-8.64	-3.96
43	Business services	-110.19	-35.21
44	Education services	-30.36	-12.42
45	Healthcare services	-35.25	-9.35
46	Other services	-189.00	-61.87
	Total Changes	**-2754.41**	**-900.96**

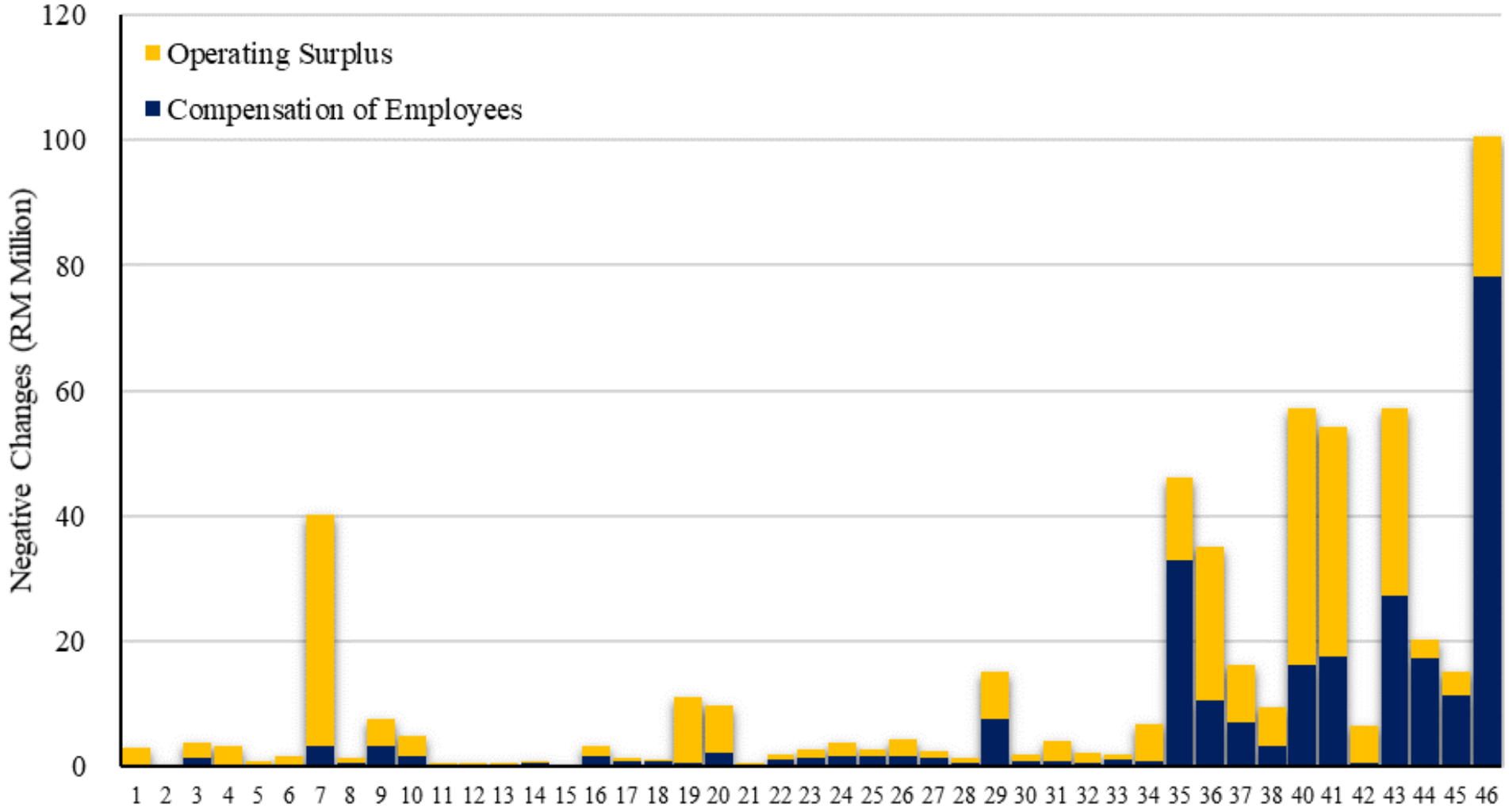
Results

- The negative changes of value added was analyzed by components which are compensation of employees and operational surplus as seen in Fig.1.

- The expected total loss in compensation of employees and operational surplus from the simulation are equivalent to RM452 million and RM449 million, respectively.

- Some sectors recorded higher loss to the compensation of employees especially for the manufacturing sectors such as clothing, furniture, rubber products and services sectors such as education and healthcare. As for crude oil and natural gas sectors, large portion of value-added loss came from the operational surplus.

Figure 1: Negative Changes in Value Added by Components.



Conclusion

Conclusions

- International aviation safety downgrade poses challenges to sustainability of Malaysia economics growth as any shocks in the air transport industry will evidently affect other industries and the country economy as a whole.

- Based on the study, we find that:
  1. The air transport industry is one of the ‘key’ industries to the economic development in Malaysia. This emphasizes its relative importance in supporting other industries and driving the economics growth.
  2. The simulation results show that if the value added in air transport industries decreases by 15% due to air safety downgrade then Malaysia's GDP will decrease by RM901 million.

Conclusions

- Although the reductions might not be significantly large compared to Malaysia's GDP, but this is a just lower bound estimates as the reductions in value added might be more than what we simulated.
- This is due to the relatively high dependency of other sectors on the air transport industry in Malaysia compared to the case of Philippines.
- Therefore, the government of Malaysia especially CAAM should ensure that Malaysian aviation safety standard meet the international aviation safety standards set by ICAO
- Hoping that Malaysian air safety rating will regain its premier status on the next audit to avoid further economics loss.

Thank you