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# Competitive Pricing Strategies of Low Cost Airlines in the Perspective of Game theory

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**Abstract.** Price is the weapon of choice for many low cost airlines in the competition for market share. Regional low cost airlines' pricing strategy for market stimulation is issuing free tickets and competing in ticket prices setting. It has been assumed as an effective strategy in influencing customers' purchasing decision. This study has documented the differences in price setting dynamics across low cost airlines operating on one of the biggest regional market and six domestic routes. A total sample of 7883 fare quotes for nonstop travel from Kuala Lumpur to Singapore and 6 domestic routes have been examined. The employment of Granger Causality Test attempts to mathematically capture the competitive behaviour in price setting. The data evidence revealed the reality of price competitiveness among the low cost airlines and game theory suggests that price cooperative should be implemented by low cost airlines for long term sustainability.

**Keywords:** Low cost airlines, Pricing Strategies, Game theory

## 1. Introduction

Business is a high staked game. Branderburger (1995) notes that essence of the business success lies on playing the right game. In the context of oligopoly and duopoly low cost airlines market structure, an airline company that lower the price of its tickets will affect not only its own profitability but also the profitability of its competitors since a lower price will influence consumers' decision making. Regional low cost airlines' pricing strategy for market stimulation is issuing free tickets and competing in ticket prices setting. It has been assumed as an effective strategy in influencing customers' purchasing decision, nevertheless, predatory price setting implied unethical business strategies, "zero sum game" method will leads one party exits from the industry. (John 1944 ) in his game theory posits the cooperative and non cooperative approaches to business games and social situations in which participants must choose between individual benefits and collective benefits. The games involved scenarios where participants must make decisions that affected not only the individual participants but also all the other participants as well. It has been used as a tool in economics to analyze competitive situations where the players of the game (companies) attempt to maximize their performance in strategic situations. Their success depends on their choices and how their competitors react to their choices and make choices in response.

The phenomenal growth of low cost airlines has triggered the interest of people to believe that they will become successful mainly due to their pricing strategy. Nevertheless, in a turbulent business environment (rising investment risks, intense competition among airlines and potential liability), there is a greater uncertainty and challenges to the success of the airlines' existing pricing strategy in fulfilling expectation of the customers. In the attempt to provide further insight into the link between price setting behaviour of the

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low cost airline, this research presents an empirical research on the questions of the *competitive pricing strategies of low cost airlines and the degrees of competitiveness*.

## 2. LITERATURE REVIEW

Based on game theory Choi and Sharan (2004) carried out the research on pricing under risk aversion and uncertainty. Their findings showed that under well defined condition the firm may be “a first mover” as the Stackelberg price leader however if the firm is under the highly uncertainty of demand conditions then it is necessary for the price leader to share market information to its rival. The equilibrium concept is based on Nash and Stackelberg games. In the Nash equilibrium, both firms make simultaneous pricing decisions, and equilibrium refers to the pair of the price which both firms are satisfied but in Stackelberg equilibrium, firm 1 is the leader and firm 2 the follower. Firm 1 uses the information to determine its optimal price and the follower observes the leader reaction to determine its own optimal price nevertheless under the uncertainty scenario, firm 1 and firm 2 have incomplete information thus the leader has to guess the follower’s payoff. In contrast, the follower has to observe the pricing decision of the leader and due to the effects of the risk aversion attitude; their research proving that firms normally will reduce prices. They further compared the Nash and Stackelberg game and these behavioural modes have their own strengths, if under the certainty condition then the Stackelberg game take advantage as the market leader but if the parameter is uncertain then this game may not hold. Meghan (2002) conducted a survey regarding airline price war, he concluded that a price war is a period in which a firm in an industry or market set price that are significantly below the usually prevailing prices. He further showed that a price war occurs because a firm cannot observe its competitors’ prices therefore it interprets a fall in demand for its own output as a sign that one of the competitors’ has offered customers a secret price cut.

A very famous human behaviour in game theory is the Prisoner’s Dilemma. In this game, there are two persons who have been caught committing the crime together. They cannot communicate to each other. Each is told

- a. If they both confess, they will get a relatively light sentence (5 years) sentence
- b. If only one prisoner confesses he will go free with a substantial reward and the other will get eight (8)years in prison.
- c. If neither confesses they will both be given one year sentence

The possible outcome can be shown in a payoff matrix (table 2.1) each prisoner can choose whether he is going to confess or not and the result of each strategy depends on what the other prisoner chooses to do. Prisoner 1 realises that Prisoner 2 may confess. In that case prisoner 1 will get five years if he confesses and eight years if he does not. If Prisoner 2 does not confess prisoner 1 will go free if he confesses and get a one year sentence if he does not. So whatever he believe prisoner 2 will do it is best if he confesses – prisoner 2 goes through the same reasoning and both confess and both get five years in prison.

Table 2.1 Payoff matrix I

	Not confess	Confess
Not confess	1      1	0      8
Confess	8      0	5      5

The concept of the game theory provides a language to formulate structure, analyze and understand strategic scenario. It attempts to mathematically capture the behaviour in strategy in which an individual successes in making choices depending on the choices of other. The possible outcome of the airlines can be shown in a payoff matrix (table 2.2) each airline can choose whether he is going to cooperate or not and the result of each decision depends on what the other airline chooses to do. If airlines choose to be cooperative then the situation will be win-win, if they compete then they will be in the situation lose-lose.

Table 2.2 Payoff Matrix II

	Cooperate	Compete
Cooperate	win      win	win      lose
Compete	lose      win	lose      lose

In the competitive situations, the choice of a strategy is determined not only by the decision maker’s view of his best advantage but by the actions or anticipated actions of a competitor. This game is a

representation for a variety of situation and it could be described as the scenario of two firms competing in the same market and instead of confessing and not confessing, this could be labelled the strategies “ set high price” and “ set low price”. Naturally, it is good for both firms to set high price but best for each individual to set a low price while the opposition sets a high price.

In the context of duopoly low cost airlines market structure, an airline company that lower the price of its tickets will affect not only its own profitability but also the profitability of its competitors since a lower price will draw consumers away from the competition. The players are assumed to be rather conservative by nature; so that they play safe never to take an excessive risk even through the rewards might be great. Their policy is to minimise the maximum possible loss. In the prisoner’s dilemma it is clear that without effective communication and understanding of mutual benefits the potential gains of cooperation will not be realised. Having a past and future allows the players to develop a longer term relationship and to behave in a way which is not best for either player in the short term but benefits them both in the long run which in the prisoner dilemma term is not to confess. Nevertheless, it is difficult for companies to generate cooperative behaviour. If a new player enters with a price lower than the incumbent it has only two effective responses: match the newcomer’s price across the board or stand pat and give up share.

Basically, airlines are facing the “prisoner dilemma”, such as two rival airlines operating from the same origin to a number of identical destinations. Generally, the service package that they offer to customers is very similar, so their rivalry is reflected in their fare offerings. The trend of the fare pattern demonstrates that a firm responds to the aggressive pricing of the competitors by pricing more aggressively itself. An increase in a competitor’s price, all other things being equal will normally prompt some passengers to switch to other airline. The reverse is also true if AirAsia raises its prices and Firefly does not and all other things being equal, AirAsia will lose some business. An increase in the Firefly’s price will normally shift the Firefly demand curve to the right and assuming AirAsia ticket price hold and Firefly drop the demand curve of Firefly will shift to the left. The substitute goods take the stand.

Game theory provides a systematic way to develop strategies when one person’s future depends on what other people do. In the context of airlines in Malaysia there are two competitors, AirAsia and Firefly. If both players maintain prices at current level AirAsia calculates that if it maintains prices and Firefly perverts incentive to cut prices and increase aircraft capacity. Firefly will increase the revenue, the logic eventually drives both to Quadrant D with both cutting price and both earning lower returns than they would with the current price.

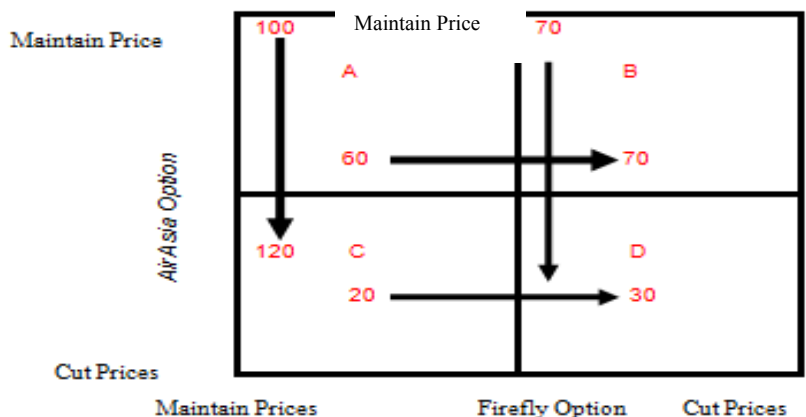


figure 2.1 Pay off matrix

This equilibrium is unattractive for both parties, if each party perceives this then there is some prospects that each will separately determine to try to compete largely on other factors such as issue free ticket price promotion, value fare and aggressive advertisement and eventually affect reputation and revenue. Therefore, low cost airlines need to observe price sensitivity of the market and predict the behaviour of the competition.

There are the needs to base price in what value is being offered to the customers. Low cost airlines need to anticipate competitor reaction and the role of business strategy in shaping pricing decision.

### 3. Research Method and Findings

#### 3.1. Granger Causality Test

Data have been collected for 2 sets of primary data from 13 November 2009 until 11 January 2010 and 23 April 2010 to 21 Jun 2010. Fare quotes have been obtained daily, for one way travel between Kuala Lumpur to Singapore and 6 other domestic routes. In this study a total sample of 7883 ticket fare quotes has been observed and ticket fares has been analyzed in detail. Data have been submitted to unit root test and the lags term for these monthly data have been fixed 1 to 19 and if the probability value greater than significance level  $P < 0.05$  then reject the hypothesis otherwise fail to reject the hypothesis.

The approach to test for Granger causality is to regress the current time series Y against the time series X to observe if jointly the coefficient associated with the x is statistically significant. Essentially, a Granger causality test looks at the pattern of variables over time to see if there is a pattern whereby one set of variable consistently precedes another for example Firefly consistently changes its fare 2 days in advance of AirAsia on the given route then this suggests Granger causality. E views 7 Microsoft package has been applied for Granger Causality test. The scenario on the Kuala Lumpur to Singapore route for four low cost airlines was based on the following equation.

$$\begin{aligned}
 PAA_t &= \sum_{i=1}^n \alpha_i PFF_{t-i} + \sum_{j=1}^n \gamma_j PJS_{t-j} + \sum_{k=1}^n \eta_k PTA_{t-k} + \varepsilon \\
 PFF_t &= \sum_{i=1}^n \beta_i PTA_{t-i} + \sum_{j=1}^n \theta_j PJS_{t-j} + \varepsilon \\
 PJS_t &= \sum_{i=1}^n \beta_i PTA_{t-i} + \varepsilon
 \end{aligned}$$

$PAA_t$  = Price of Air Asia,  $PFF_t$  = Price of Firefly,  $PJS_t$  = Price of Jetstar Asia,  $PTA_t$  = Price of Tiger Airway, “ $PAA_t$  “causes”  $PFF_t$  or  $PFF_t$  “causes”  $PAA_t$ ”

On the Kuala Lumpur to six domestic routes ( the duopoly market structure) was based on the below equation.

$$PAA_t = \gamma_0 + \sum_{i=1}^n \alpha_i PAA_{t-i} + \sum_{i=1}^n \alpha_i PFF_{t-i} + \varepsilon$$

#### Results

Table 1 The results of Granger Causality Test (13 November to 11 January 2010) and (23 April to 21 Jun 2010)

Null Hypothesis	Destinations	13 Nov to Jan 2010	23 Apr – 21 Jun 2010
Low cost airlines did not granger cause each other In domestic routes	K.Lumpur - Penang	Fail to reject	Reject
	K. Lumpur - Langkawi	Fail to reject	Reject
	K. Lumpur – Kota Bahru	Reject	Reject
	K.Lumpur–K.Terengganu	Reject	Fail to reject
	KualaLumpur - AlorSetar	Reject	Reject
	K. Lumpur – Johor Bahru	Reject	Reject
Low cost airlines did not granger cause each other In regional route	K.Lumpur - Singapore	Reject	Reject

### 4. Conclusion and Discussion

The ‘open sky’ deregulation policy has led to price war, Granger Causality Test has concluded that in these oligopoly and duopoly market structures, there was a significant trend that ticket price of low cost airline granger cause each other and the tendency of low cost airlines’ ticket prices was more towards Barometric price leadership whereby the leader may not have a large market share but acted as a barometer and there was a tendency of frequent switches in the leadership position. Ticket price of Firefly low cost

airline has given a significant impact to AirAsia low cost airline in domestic routes, out of these six domestic routes four were significantly given the effects to AirAsia low cost airline's ticket prices. Based on the competitive price setting scenario, the predatory and dynamic price strategies of the low cost airlines, which eventually all the parties might lost in the competition, this study suggested that in long term profitability low cost airlines need to play different network strategies, the finding assisted by the game theory, airlines need to sustain cooperative pricing behaviour as a more stable equilibrium. For example, they may compete aggressively for certain routes but may form alliance – cooperate for other routes. In the prisoner's dilemma theory it is clear that without effective communication and understanding of mutual benefits the potential gains of cooperation will not materialize. Business is a game, for long term viability airlines need to play the role effectively in this game, every firm is vulnerable to attack by the competitors and as a strategic financial control tool, pricing strategies must be able to influence customers' buying behaviour which in turn brings about the desired business objective. Thus, failure to comprehend customers' perception and price satisfaction which in turn bring about the consequent customer changing preference behaviour that would only led to observation of notoriously disloyal phenomena. Porter (2008) indicated that competitive advantage grows fundamentally out of value a firm is able to create for the buyers that exceeds the firm's cost of creating it. Value is what buyers are willing to pay and superior value stems from offering lower price than competitors for equivalent benefits. Faced with the many challenges of governmental control and interference, intense industry competition and more demanding customers, the survival of the low cost airlines depends greatly upon the development of sustainable competitive strategies through the increase of load factor in more lucrative market segment, price cooperative and image positioning. More importantly, the price expectation and satisfaction of the customers deserved attention.

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