

The Impact of Airline Liberalization on Fare: The Case of the Philippines¹

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ABSTRACT

This paper explores the impact of liberalization on airfare using a framework that builds on previous work but adapted to the idiosyncrasies of the Philippine airline industry. Using a sample of ten routes with varying market characteristics for the period 1981–2003 and the generalized method of moments to estimate the system of equations simultaneously, the findings indicate that airfare per kilometer is 10 percent lower, on average, after liberalization. Furthermore, more than 90 percent of domestic airline passengers in 2003 benefited from lower fares due to discounts and promos, as a result of competition, in order to stimulate demand.

Keywords: airline industry, liberalization, airfare

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INTRODUCTION

The Philippine government liberalized the country's domestic airline industry in 1995 under Executive Order 219, which reduced regulations on tariffs and fares and on the entry into and exit from the airline industry. Only one airline, the Philippine Airlines (PAL), operated domestic flights prior to liberalization due to the government's one-airline policy.

The domestic airline industry attracted as many as six players at one time but this number has dwindled to four, following the failures of two airlines. The demise of new entrants in a relatively short period is comparable to the experience of the domestic airline industry in the United States (US) in the early 1980s (Kahn 1988; Borenstein 1992). With the entry of South East Asian Airlines (SEAir) in the scheduled airline sector in 2003, three airlines now compete in major routes (PAL, Cebu Pacific, and Air Philippines), while two airlines serve minor and short-distance routes (Asian Spirit and SEAir). These developments give domestic airline passengers choices that never existed before 1995.

Although the impact of deregulation and liberalization on the airline industry is well-documented in the US and Europe, previous studies on the Philippine airline industry tend to be descriptive and do not use econometric analysis of available data. This study builds on the empirical framework employed by Dresner and Tretheway (1992); Maillebiau and Hansen (1995); Marin (1995); Jorge-Calderon (1997); and Rietveld, Schipper, and Nijkamp (2002) to estimate the impact of liberalization on airfare.

THE IMPACT OF DEREGULATION ON THE AIRLINE INDUSTRY

Competition under regulation usually revolved around service quality, which encourages overcapacity that tends to inflate price (fare), while deregulation shifted competition towards price (Douglas and Miller 1974; Graham, Kaplan, and Sibley 1983). In the US domestic airline industry, deregulation resulted in lower fares and higher load factors.

Olson and Trapani (1981) examine the policies of the US CAB to determine who benefited from regulation by developing a method that evaluates the US CAB's policies, as well as analyzing the distribution of benefits due to regulation. Using an econometric model specified and estimated utilizing cross-sectional samples of city-pair markets in 1971, 1976, and 1977, the

results indicate that the pricing policies of the US CAB did not serve the interests of consumers: in 1971 the US CAB set prices too high to serve the interest of consumers, shifting the benefits of regulation from consumers and airlines to aircraft manufacturers and other industry suppliers. The findings tend to support the results of Keeler (1972).

Moore (1986) analyzes the effects of airline deregulation on passengers—business and personal trips, first class and coach—and explores how deregulation affects capital and labor. The author examines five markets to show the effect of deregulation on long-haul major markets, medium-haul markets, and short-haul markets in 1976 and 1983, and estimates the fare equation using ordinary least squares (OLS) with dummy variables for markets with five or more carriers. Using two-stage least squares (2SLS) to determine the relationship of the number of passengers with density, the findings indicate that deregulation results in a substantial increase in the number of passengers, especially in the tourist market and those traveling on discount fares. Capital seems to benefit from deregulation either through more efficient use due to higher load factors and fewer staff per flight or the appreciation of the share prices of major airlines. On the contrary, airline deregulation appears to result in lower wages despite initial gains in employment in the newer airlines.

Borenstein (1992) reports that the Herfindahl Index for the US domestic airline industry fell five years after deregulation (0.106 in 1977 and 0.093 in 1982) and increased steadily since then, reaching 0.121 in 1990. Moreover, the four-firm concentration ratio increased from 56 percent in 1977 to almost 62 percent in 1990, while the eight-firm concentration ratio increased from 81 percent to almost 91 percent in the same period. The increase is partly due to the boom in entry during the initial years under deregulation and later reversed as new entrants either merged with incumbents or declared bankruptcy and ceased operations. Airfares fell substantially in most city-pairs, especially on long distance routes, while real prices on shorter routes did not fall as much and even increased in some markets (see Graham et al., 1983). Nevertheless, airfares on markets with two active airlines were, on average, eight percent lower than on monopoly routes in 1990, while a third airline resulted in an additional eight percent drop in fares.

Bailey (1992) observes that while the number of airlines shrunk by more than half, the degree of competition intensified in the post-regulation period. Deregulation allowed airlines to focus on their markets and operations, which produced new core operating capabilities such as

the hub-and-spoke delivery systems, as well computer reservation and yield management systems. Industry observers thought that deregulation was responsible for the decline in the number of airlines through merger, acquisition, and bankruptcy. However, deregulation may not be the major cause because a number of studies show that a proliferation of firms is typical under deregulation, which is then followed by rapid consolidation. Passengers also contributed to the current structure of the industry because the average passenger usually selects lower-priced services with fewer frills, making low-cost airlines a success under deregulation.

THE IMPACT OF DEREGULATION AND LIBERALIZATION ON FARE

Graham et al. (1983) test two hypotheses that are central to the arguments for deregulation by analyzing the US domestic airline industry before and after deregulation. The first hypothesis argues that fare regulation promotes service competition among airlines by employing excess capacity (Douglas and Miller 1974). The second hypothesis contends that “potential competition will keep fares at competitive levels, even in highly concentrated markets,” which rests on the idea that capital is highly mobile in the airline industry and related to the argument that airlines compete in a contestable market (Bailey 1981). The results tend to indicate that routes shifted toward a single airline, and large and medium hubs had more flights in 1981 than in 1978, the year the US ratified the Airline Deregulation Act. After 1978 market concentration declined in some markets due to entry by new carriers. While the proponents of deregulation predicted that fares would decrease as competition intensifies, empirical findings suggest mixed results. Fares increased in short-haul markets, while fares tended to decline as distance and market density (number of passengers) increased. Competition also increased the frequency of giving discount fares to passengers, further reducing average fares, which supports the notion that deregulation benefits consumers through lower airfares.

Dresner and Tretheway (1992) use a methodology derived from the neoclassical maximization theory to measure the effect on prices of a change in government policy, which in turn leads to a change in market conduct (Brander and Zhang 1990; Marin 1995). The authors apply the methodology on a number of international routes from 1976–81 in order to determine the effects of market structure (conduct) on fares and study the benefits to consumers due to bilateral liberalization, and estimate the empirical model using two-stage indirect least squares due to the endogeneity of the passenger variable. The findings tend to indicate that the policy

change results in a significant effect, reducing discount airfares by an average of 35 percent. However, the policy change has no statistically significant impact on the undiscounted fare that first class, business class, and other non-leisure travelers use.

Maillebiau and Hansen (1995) study the impact on consumer benefit arising from bilateral liberalization in North Atlantic routes for the years 1969–89 using a model that incorporates the service accessibility variable (number of gateways with airline service) on the demand side and the price variable on the supply side to estimate how liberalization affects the ‘generalized cost’ (a function of monetary cost and service accessibility). The estimation of the resulting change in consumer surplus helps evaluate liberalization against the stated objectives of the major proponents of deregulation and liberalization, which is to benefit consumers. The authors estimate the empirical model using the Yule-Walker method due to autocorrelation and the findings indicate that liberalization results in a 35 to 45 percent reduction in fare, while accessibility increased 38 percent.

Kahn (2002) suggests that the two most important benefits of deregulation are lower fares and higher productivity. The average fare that passengers actually paid declined 30 percent in real terms between 1970 and 1990, although the decline may be partly due to the introduction of jumbo jets even before 1978. The best estimates suggest that deregulated fares are between 10 and 18 percent lower, on average, compared to the level of fares under regulation. The lower fares redound to passenger savings from US\$5 billion to US\$10 billion per year since more than 90 percent of all passenger-miles traveled in 1990 were on discount tickets. As expected, fare per mile is much higher on thinly traveled routes than on high-density markets. However, after adjusting for differences in distance and traffic density, fares on routes served by the eight most concentrated hubs averaged almost 19 percent higher compared to similar markets served by other airports.

Rietveld et al. (2002) analyze the consumer benefits associated with airline liberalization on selected intra-European routes using data on 34 routes from 1988–92. The sample routes represent different traffic densities and stage lengths, while the period between 1988 and 1992 represents various degrees of liberalization in the European airline market. The authors estimate the empirical model using 2SLS due to the endogeneity of the passenger, fare, and frequency variables. Their results indicate that economy fares on fully liberalized routes are 34 percent lower than on routes without such degree of liberalization.

EMPIRICAL FRAMEWORK

The econometric model consists of three equations since a system of equations is a more realistic depiction of the underlying theory on airline demand and is usually more appropriate when modeling the data generation process on the number of passengers, number of flights, and level of fare in one or more airline markets (Judge, Hill, Griffiths, Luetkepohl, and Lee 1988). Furthermore, supply and demand simultaneously determine the values of fare, the number of passengers, and frequency whether under regulation or liberalization. System methods are also more efficient than single equation methods because system methods use all available information in parameter estimation, which results in more efficient estimators by taking into account correlations among residuals and cross-section equation restrictions (Greene 1997).

Fare, expressed as average airfare per kilometer, is a function of endogenous variables (number of passengers and departure frequency), an exogenous cost variable, two dummy variables that measure the impact of shocks on the industry, exogenous geo-economic variables such as income and distance (Jorge–Calderon 1997), and the liberalization dummy (Rietveld et al. 2002). Fare is expected to respond positively with income since airlines tend to inflate prices in more affluent markets where passengers are less price-sensitive, while fare is expected to decrease with distance because the airlines' fixed costs are distributed over a longer distance. Airfare is expected to decrease with frequency since additional flights, given a particular level of demand, tend to result in lower fares. Fare is expected to increase with cost since airlines are likely to set fares that enable them to recover their operating costs. The effect of the Asian financial crisis on fare is expected to be positive because the price of aviation fuel and other imported inputs increased in peso terms. The impact on fare of the September 11, 2001 terrorist attack on the US is also expected to be positive because oil prices surged in the aftermath of the attack. The additional cost of enhancing security at airports and in aircraft cabins following the attack also contributes to higher fares. The fare equation is specified as:

$$\begin{aligned} \ln \text{FARE} (xy) = & \beta_0 + \beta_1 \ln \text{PSGR} (xy) + \beta_2 \ln \text{FREQ} (xy) + \beta_3 \ln \text{INCM} (xy) + \\ & \beta_4 \ln \text{DIST} (xy) + \beta_5 \ln \text{VCST} (xy) + \beta_6 \text{LIBR} (xy) + \beta_7 \text{FCRI} (xy) + \\ & \beta_8 \text{TERR} (xy) + \varepsilon (1, xy), \end{aligned}$$

where for each route x and year y ,

FARE = the 'average fare' per kilometer in pesos

- PSGR = the number of enplaned passengers
- FREQ = the number of two-way flights
- INCM = the mean per capita regional gross domestic product (RGDP) of endpoint cities
- DIST = the two-way distance between airports in kilometers
- VCST = the ‘average’ variable cost per passenger–kilometer
- LIBR = dummy variable, which takes a value of ‘0’ between 1981 and 1994, ‘1’ between 1995 and 2003
- FCRI = dummy variable representing the effect of the Asian financial crisis in 1997–98, which takes a value of ‘1’ in 1998, ‘0’ otherwise
- TERR = dummy variable representing the impact of the terrorist attack on the US on September 11, 2001, which takes a value of ‘1’ in 2001, ‘0’ otherwise
- ε = the error term

Demand, expressed as the number of passengers, is a function of two endogenous variables (fare and frequency), exogenous variables, and the liberalization dummy (Marin, 1995; Jorge–Calderon, 1997; and Rietveld et al., 2002). The passenger equation is specified as:

$$\ln \text{PSGR} (xy) = \beta_0 + \beta_1 \ln \text{FARE} (xy) + \beta_2 \ln \text{FREQ} (xy) + \beta_3 \ln \text{POP} (xy) + \beta_4 \ln \text{CPCY} (xy) + \beta_5 \ln \text{DIST} (xy) + \beta_6 \ln \text{ALTM} (xy) + \beta_7 \text{LIBR} (xy) + \varepsilon (1, xy),$$

where for each route x and year y ,

- POP = the mean of the provincial populations of endpoint airports
- CPCY = the ‘average’ number of passenger–seats per two-way flight
- ALTM = the ‘average fare’ per kilometer of land or sea transport
- and the other variables are as defined in the fare equation.

Frequency, expressed as the number of two-way flights, is a function of the endogenous passenger variable and exogenous variables (Rietveld et al. 2002) and specified as:

$$\ln \text{FREQ} (xy) = \beta_0 + \beta_1 \ln \text{PSGR} (xy) + \beta_2 \ln \text{CPCY} (xy) + \beta_3 \ln \text{OPTR} (xy) + \beta_4 \text{TERR} + \varepsilon (1, xy),$$

where for each route x and year y ,

- CPCY = the ‘average’ number of passenger–seats per two-way flight
- OPTR = the number of airlines

and the other variables are as defined in the fare and passenger equations. All continuous variables are expressed in natural logarithms so that the coefficients can be interpreted as elasticities (Dresner and Tretheway 1992; Maillebiau and Hansen 1995; Rietveld et al. 2002).

METHODOLOGY

Maillebiau and Hansen (1995) consider the fare variable as exogenous and estimate both the demand and fare equations using OLS, while Dresner and Tretheway (1992) treat the passenger variable as endogenous in the fare equation, which they estimate using the two-stage indirect least squares method. Marin (1995) estimates the demand and fare equations separately using instrumental variables for the endogenous variable in both equations, but does not consider the frequency variable. Jorge-Calderon (1997) considers fare as exogenous and frequency as endogenous in the demand equation and uses weighted 2SLS. Rietveld et al. (2002) consider the passenger, fare, and frequency variables as endogenous and use 2SLS.

This article uses available data on airline-related variables, such as the number of passengers, fare, flight frequency, cost, capacity, distance, and the number of operators from the Civil Aeronautics Board (CAB), as well as published data on income, population, and consumer price index from the Philippine Statistical Yearbook. The Land Transport Franchising and Regulatory Board and the Maritime Industry Authority provided the data on bus and passenger ship fares, respectively.

The sample consists of ten city-pairs with the most complete data. The sample routes have the following characteristics: attracted entry at one time; represent the 'short' (up to 350 kilometers), 'medium' (351 to 700 kilometers), and 'long' (at least 701 kilometers) haul markets; at least one competing mode of transport exists; and Metro Manila is the other end of the route.

The econometric model consists of three equations due to the endogeneity of the passenger and frequency variables in the fare equation, the endogeneity of the fare and frequency variables in the passenger equation, and the endogeneity of the passenger variable in the frequency equation. The researcher estimates the three equations simultaneously because estimators obtained from a system of equations that are estimated one equation at a time are biased and inconsistent due to the inclusion of endogenous variables among the explanatory variables (Intriligator 1978). The data set, consisting of panel data from 1981 to 2003 representing ten markets for a total of 230 observations per equation or 690 for the system of

equations, is a 'balanced panel' because the data has the same number of periods for all cross-section units or routes (Wooldridge 2002). Relative to pure cross-section or time-series data, panel data are better able to control for individual heterogeneity; offer more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiency; better able to identify and measure effects; and better able to eliminate biases resulting from the aggregation over airlines at the route level (Baltagi 2001).

The researcher observes statistically significant autocorrelation when the model is estimated using OLS. The literature deals with the problem of autocorrelation in a number of ways. Mailliebau and Hansen (1995) use the Yule–Walker method to correct the OLS estimates, while Keeler (1972) uses the Balestra–Nerlove estimator. Rietveld et al. (2002) report first order autocorrelation but do not correct the 2SLS estimates and simply argue that the Durbin–Watson coefficients are in the indeterminate range. In this study, the researcher estimates the model using the generalized method of moments (GMM) estimator based on the Newey–West covariance estimator, which is robust to both heteroskedasticity and serial correlation (Verbeek 2000). The Newey–West estimator provides a way to calculate consistent covariance matrices in the presence of both autocorrelation and heteroskedasticity (Johnston and DiNardo 1997), while the GMM allows one to drop the assumption of homoskedasticity and apply White's estimator for heteroskedasticity of unknown form (Greene 1997). Since the GMM estimator based on the Newey–West covariance estimator is robust both to heteroskedasticity and autocorrelation, the estimation method used in this study is an improvement over the estimation methods employed in previous work on airline data.

Rietveld et al. (2002) use a fixed-effects model in estimating their equations to control for the unobserved heterogeneity between years and country-pairs. In this study, the researcher also estimates the econometric equations using the fixed effects model, treating the systematic time and space variation in the data as fixed effects, in order to control for the unobserved heterogeneity between years and city-pairs. Johnston and DiNardo (1997) argue that the fixed effects estimator is robust to the omission of any relevant time-invariant explanatory variables and preferred to the random effects estimator unless one is certain that all the time-invariant factors that are possibly correlated with the other explanatory variables are measurable.

ESTIMATION RESULTS AND ANALYSIS

The measurement of the fare variable is quite problematic since liberalization intensified the practice of third-degree price discrimination among airlines. One solution proposed in the literature is the use of the full economy fare since the average of business class and discount fares tends to approximate the full economy fare (Rietveld et al. 2002), while Maillebiau and Hansen (1995) use discount fares since most passengers fly using discount fares under liberalization. This paper uses the average of the full economy and discount fares, since only one airline in the Philippines offers business class for domestic passengers on a number of routes and all major airlines offer discounts and promos throughout the year. Since the data from CAB do not include the number of passengers for each level of fare, this article uses the simple average of the full economy and discount fares. The measurement of the frequency variable also poses some problems because the records from CAB are fraught with errors. Information on flight cancellations and additional flights are rarely available, while data on flight schedules for a number of years are missing for some airlines. Consequently, this paper derives the frequency variable using the number of passenger-seats divided by the average aircraft size. The cost variable is also difficult to measure. Rietveld et al. (2002) use total operating expenses per available ton-kilometer to construct the cost variable using data on large flag carriers, while Marin (1995) uses 'airport presence' and 'wages' as proxies for cost. In this paper, the airlines' identifiable variable costs constitute the cost variable, as defined in the literature (see ABN-AMRO 2002) and as reported in the airlines' income statements, computed as variable cost per passenger-kilometer. Table 1 presents the result of the fare equation estimation.

The number of passengers (PSGR) is highly significant and as expected, a higher demand results in higher prices. However, with a coefficient of 0.45, fare is relatively inelastic with respect to demand, which seems in line with those of Dresner and Tretheway (1992) and Marin (1995) who report highly significant coefficients of 0.74 and 0.08, respectively.

The frequency (FREQ) variable is highly significant and, as expected, has a negative impact on airfare per kilometer, since a higher supply leads to a lower price, *ceteris paribus*. With a coefficient of 0.51, however, frequency is inelastic in relation to price. The results of this study conform to those of Graham et al. (1983) who use NEWCERT, a variable representing the presence of new carriers in a route, in their fare equation with estimates ranging from -0.27 to -

0.18, all highly significant. Since additional carriers serving a route tend to result in more flights, the NEWCERT variable is interpreted as a proxy for the frequency variable.

Table 1 here

The coefficient of the income variable (INCM) is highly significant. A percent increase in per capita income results in a 0.86 percent increase in airfare, which tends to indicate that airfares are higher in markets with a higher per capita GRDP.

Although the coefficient of the cost variable (VCST) is significant at the five percent level, the cost variable does not behave as expected despite the use of identifiable variable costs. The negative sign suggests that airfare per kilometer declines as cost per passenger-kilometer increases. Marin (1995) and Rietveld et al. (2002) report highly significant coefficients for the proxies and the cost variable, respectively. However, Dresner and Tretheway (1992) and Maillebiau and Hansen (1995) do not include a cost variable in their price equation due to the lack of airline cost data to derive the marginal cost.

The airlines' practice of 'milking' their most profitable routes, which are usually the longer routes like Manila–Cebu City, Manila–Cagayan de Oro, and Manila–Davao City in order to subsidize unprofitable routes, usually shorter routes like Manila–Baguio and Manila–Legazpi, may help explain the negative sign of the cost variable in the price equation. Keeler (1972) reports that high-density markets in the US are more profitable than the aggregate airline rates of return and argues that airlines use the excess profits to cross-subsidize airline service on less profitable, low-density markets. Airlines operating with low load factors have tremendous incentives to reduce fares (Besanko, Dranove, Shanley, and Schaefer 2004), so the argument that Philippine carriers are reluctant to pass the average cost per kilometer on to passengers on some routes that have little demand for fear of further depleting passenger traffic is not unreasonable. Since longer routes have lower cost per kilometer because fixed costs are distributed over a longer distance, the negative sign may mean that airlines are likely to inflate airfares in longer routes. An examination of the airlines' income statements indicates that the gross passenger revenue across airlines exceeds the variable component of the airlines' direct operating expenses. In addition, the positive gross operating income suggests that airlines are able to cross-subsidize routes with little traffic by charging more per kilometer on longer and high-density routes, which may indicate that cross-subsidization is profitable.

Graham et al. (1983) argue that the US CAB set fares below cost in short-haul markets and above cost in long-haul markets during regulation. The reluctance of Philippine carriers to increase fares to reflect costs in routes with relatively less traffic for fear of reducing demand and the practice of charging higher fares in routes where demand is relatively price inelastic tend to indicate that some form of cross-subsidization persists. In addition to cross-subsidization, the negative relationship between cost and fare may be due to heavy discounting during lean seasons. Since the government deregulated fare setting in markets with at least two airlines, some airlines are likely to set fares below average cost during off-peak periods to induce demand and increase market share at the expense of rivals. Besanko et al. (2004) argue that airlines offer big discounts during lean seasons because selling a seat near marginal cost but below average cost is better than not being able to sell the seat at all.

Figure 1 here

The practice of heavy discounting in the early years of liberalization in the Philippines appears to be the major cause of Grand Air's demise. The 'fare war' that ensued between the upstarts — Grand Air, Cebu Pacific, and Air Philippines — in order to grab market share probably resulted in airfares that are below average costs. Figure 1 shows that average fares on routes served by Grand Air in 1998 are lower than in 1997, despite the fall in the value of the Philippine peso in the same period, which increased the cost of jet fuel and other imported inputs in peso terms. Since the price elasticity of demand for jet fuel is inelastic, ranging from 0.00 to 0.15 (Pindyck and Rubinfeld 1998), Grand Air's operating cost most likely increased during this period, exacerbating the airline's already dire financial condition. The 0.13 coefficient means that a cost increase is not fully translated into an increase in airfare. Marin (1995) and Rietveld et al. (2002) also report similar findings. Regulatory lags that are inevitable in the review process, which persisted until 1995 may partly explain the findings that increases in cost are not fully translated into fare increases. Moreover, the ensuing practice of CAB to regulate fares in markets with only one airline probably contributed to the low coefficient of the cost variable. Since only Manila–Cebu City and Manila–Davao City attracted entry in 1995, most of the routes included in the sample remained regulated until 1996 and three of the city-pairs in the sample reverted to single airline markets by 2001. The documents obtained from CAB indicate that airlines still use distance-based formula for fare setting, which is useful in helping airlines decide

on the level of airfare that may stimulate demand while minimizing the impact discount fares have on profits.

The distance (DIST) variable has the expected sign — airfare per kilometer falls with distance — and is highly significant and inelastic, which is consistent with the results of Marin (1995) and Rietveld et al. (2002). The coefficient of 0.51 seems in line with the 0.40 obtained by Rietveld et al. (2002) and 0.33 by Marin (1995). Graham et al. (1983) also obtained a similar result in their study of the US domestic airline industry — average fare per mile declines up to 1,000 miles then remains almost the same up to 2,000 miles, and then declines again. All the routes considered in this paper have stage-lengths of less than 1,000 miles.

The liberalization of the Philippine domestic airline industry results in a 10 percent reduction in fares, computed as $\Delta fare = (\varepsilon / (\ln y + \varepsilon))$, where ε is the coefficient of LIBR and y is the average airfare under liberalization. Borenstein (1992) reports similar findings in markets with at least two active airlines. The reduction in airfare under liberalization means that regulation is likely to result in higher fares as observed by Keeler (1972), Olson and Trapani (1981), Graham et al. (1983), Moore (1986), Kahn (1988), and Rietveld et al. (2002). Moreover, Moore (1986) observes that markets with more than four carriers experienced a reduction in airfares by 24 to 29 percent when 1983 fares are compared to their 1976 levels. Despite the fact that the maximum number of airlines serving a number of routes in the Philippines is three after the failure of Grand Air, liberalization results in lower fares for markets with at least two airlines. This observation is consistent with findings that indicate prices are lower in markets with two sellers instead of only one and that price competition intensifies when the number of sellers increases from two to three (Besanko et al. 2004).

The Asian financial crisis (FCRI) and the terrorist attack (TERR) on the US result in an increase in the average fare. Specifically, the Asian financial crisis results in over five percent increase in fare between 1997 and 1998, computed as $\Delta fare = (\varepsilon / (\ln y + \varepsilon))$, where ε is the coefficient of FCRI and y is the average airfare in 1997. The terrorist attack on September 11, 2001 results in almost nine percent increase in fare from the previous year, computed as $\Delta fare = (\varepsilon / (\ln y + \varepsilon))$, where ε is the coefficient of TERR and y is the average airfare in 2000. The two shocks tend to result in higher prices as airlines adjust fares to reflect the increasing cost of operations. These shocks appear to reduce the downward impact of airline liberalization on fare.

CONCLUSION AND POLICY IMPLICATION

This paper empirically explored the impact of airline liberalization on fare using a sample of ten routes with varying market characteristics and state of competition for the period 1981–2003. The estimated fare equation indicates that fare per kilometer on routes served by at least two airlines is, on average, 10 percent lower. Twenty-three routes, representing more than 90 percent of total domestic passengers in 2003, have at least two airlines, which imply that most passengers benefit from lower fares. Therefore, although deregulation and liberalization encourage airlines to price discriminate in order to improve profitability and increase demand (Kahn 1988), Philippine domestic airline passengers are better off under liberalization because of the downward pressure on price as a result of the prevalence of discounts and promos due to competition (Graham et al. 1983; Moore 1986; Rietveld et al. 2002) than under regulation.

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Table 1
Fare Equation

Dependent Variable: Airfare per Kilometer (FARE)

Estimation Method: Generalized Method of Moments

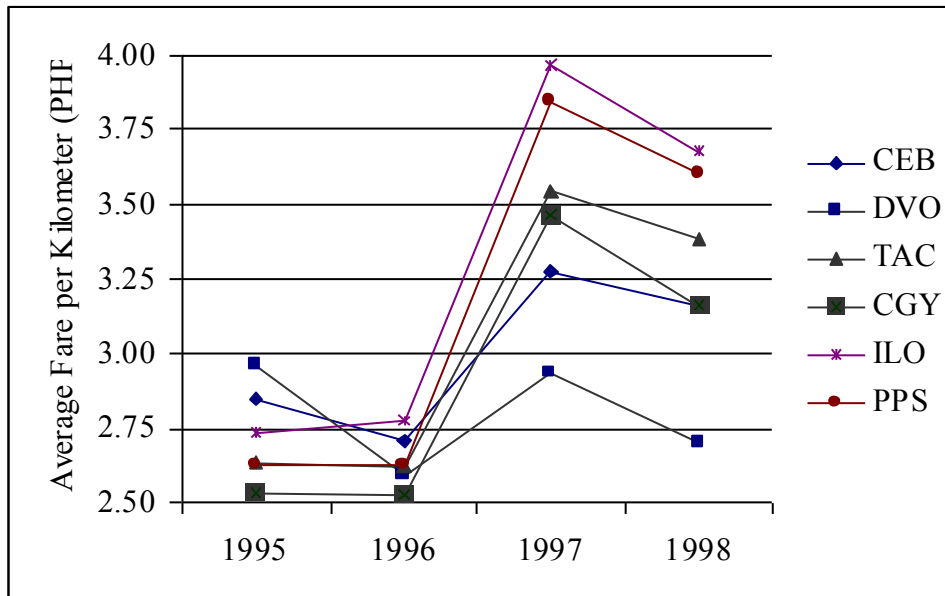
Instruments: INCM, POPN, DIST, CPI, OPTR, LIBR, FCRI, TERR

Variable	Coefficient	Standard Error	t-Statistic	Probability	
PSGR	0.450032	0.056736	7.932053	0.0000	*
FREQ	-0.511672	0.078416	-6.525119	0.0000	*
INCM	0.855906	0.040128	21.329210	0.0000	*
DIST	-0.509189	0.078604	-6.477909	0.0000	*
VCST	-0.126182	0.060145	-2.097952	0.0363	**
LIBR	-0.157556	0.043119	-3.654001	0.0003	*
FCRI	0.088436	0.021644	4.085985	0.0000	*
TERR	0.132382	0.041691	3.175316	0.0016	*
Adjusted R ²				0.9266	
Included observations				230	

* Significant at the one percent level (highly significant)

** Significant at the five percent level

Figure 1
Average Fares for Routes Served by Grand Air



Source of Basic Data: Civil Aeronautics Board. CEB stands for Manila–Cebu City, DVO stands for Manila–Davao City, TAC stands for Manila–Tacloban, CGY stands for Manila–Cagayan de Oro, ILO stands for Manila–Iloilo City, and PPS stands for Manila–Puerto Princesa.