



Market competition and market price: Evidence from United/Continental airline merger



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ABSTRACT

Using a difference-in-differences technique, this paper examines the relationship between market competition and market price in the airline industry by presenting a case study of United and Continental Airlines merger. I find that, in nonstop markets, the price for routes formerly competitive between United and Continental Airlines increases significantly following the merger. This result is robust after controlling for route-specific factors and using different samples and specifications. The market power effect dominates efficiency gains consistently throughout the whole merger process and after the merger was finalized. I also find that the increase in price is only on directly affected routes, not those out of adjacent airports. Since both United and Continental Airlines are legacy carriers, this paper provides informative results for future antitrust decision-making.

1. Introduction

The decades following the Airline Deregulation Act of 1978 have seen a number of airline mergers. The question of effects, particularly in price, has inspired debate among economists and policy makers as a concern central to antitrust decision making. While extensive literature exists on the fare impact of airline mergers, most of these studies focus on relatively small mergers that occurred in the distant past.¹ More recent, larger mergers between U.S. legacy airlines—Delta/Northwest Airlines, United/Continental Airlines and American/U.S. Airways Airlines—will predictively have a more significant impact than previous mergers.² A study that looks at these most recent airline mergers will provide a needed empirical evaluation of the effects of larger airline mergers and offer significant guidance to future policy makers.

Despite the importance of this topic, theoretical indeterminacy complicates the inference of the merging effect. The net price effect results from both market power effect and efficiency gains. On one hand,

after a merger, a decrease in competition level and an increase in market power should mean the price will increase. On the other hand, improvement in production techniques as a consequence of a merger could lead to a price decrease. Given that these two effects work in different directions, the overall price effect of a merger is ambiguous, and the net effect is ultimately an empirical question.

This paper, to the best of my knowledge, is the first to focus on the merger between United and Continental Airlines and empirically estimate the causal effect of the legacy airline merger. In the paper, I exploit both time series and cross sectional variation in the implementation of the merger. In particular, I include only routes operated by both United and Continental Airlines one quarter prior to the merger in the group I consider most affected. Correspondingly, to account for non-merger effects on price and other outcomes, all other routes are considered as a less affected group.³

My main results indicate that, in nonstop markets and with all other things being equal, compared to the pre-merger periods, the prices for routes formerly competitive between United and Continental Airlines

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¹ For example, Borenstein (1990) investigates the Northwest/Republic merger and Two/Ozark merger; Kim and Singal (1993) analyze 14 airline mergers that occurred during the period 1985–1988.

² Airlines can be divided into two groups of carriers based on their operation cost structure: legacy carriers and low-cost carriers. While legacy carriers are more focused on hub-and-spoke route structures, low-cost carriers are more emphasize point-to-point service among secondary airports within big metropolitan areas. According to Brueckner et al. (2013), legacy carriers are always large airlines, including American (AA), Alaska (AS), Continental (CO), Delta (DL), Northwest (NW), United (UA), US Airways (US) and Midwest (YX).

³ The Less affected group include routes flown by only United or only Continental Airlines prior to the merger and routes flown by other airlines other than United or Continental airlines prior to the merger. Or equivalently, the less affected routes are those where United and Continental did not compete with each other in the pre-merger periods.

increased by 7.8%, and this effect is statistically significant at the 5% level. This result remains robust when I control for route specific factors and use various samples and specifications. I also find, interestingly, that although fares on directly competitive routes prior to the merger are significantly increased as a consequence, fares on adjacent routes are not largely affected (e.g., rates increase for the Chicago-O'Hare to Denver route, but not for the Chicago-Midway to Denver route). This result may indicate that routes flown from adjacent airports are not quite substitutable. In addition to the overall average effect, I decompose the price impact by period. The estimation results show a consistent positive price effect throughout the whole merger process and after the merger was finalized.

The rest of the paper is structured as follows. Section 2 provides a brief description of the related existing literature and the background on United and Continental airlines merger. Section 3 discusses the construction of the data and presents descriptive statistics. Section 4 outlines the empirical identification strategy and reports the regression results for the baseline model, the decomposition model, and other robustness checks. Section 5 presents my conclusions.

2. Background

2.1. Related literature

The effect of airline mergers on airfares is not a new topic of research, and economists have published a number of empirical studies on related topics. While some studies (Bilotkach, 2011; Richard, 2003) examine the non-price effects of mergers (i.e. the effect on flight frequency), a large number of studies investigate the price effects. Notable examples include (Borenstein, 1990), Kim and Singal (1993); Brueckner and Spiller (1994); Morrison (1996); Kwoka and Shumilkina (2010); Bilotkach and Lakew (2014) and Luo (2014).

Most existing papers that focus on previous airline mergers present consistent conclusions about price effect: the increased market power effect caused airfares to rise in the post-merger periods. In particular, Borenstein (1990) analyzes the effects of two controversial airline mergers—Northwest/Republic and TWA/Ozark—expected to result in a substantial increase in market power, and finds that fares increased significantly following the mergers, although the evidence in the TWA/Ozark case is weaker. Kim and Singal (1993) examines 14 airline mergers during 1985–1988, and documents a surge of increased market power that increases the airfares of the treatment group relative to the control group. Most of the resulting papers are focused on mergers among small carriers during the 1980s, but the results of small mergers this far in the past may not be reliable enough to forecast any accurate generalizations applicable to the greater mergers among legacy carriers in recent years.⁴

In one paper that does examine a recent merger case, Luo (2014) investigates the price impact of Delta/Northwest Airlines merger, but does not find a dramatic fare impact. Specifically, her results show the fares for airport-pairs where both Delta and Northwest were present prior to the merger did not significantly increase in nonstop markets following the merger, but fares did increase slightly in connecting markets. However, Luo only uses a two-quarter event window to estimate the price effect of the merger—one quarter before the merger and one quarter after the merger. Given that the period examined is so small, the results might be driven by her choices of event window length or baseline comparison period. The estimates could also be contaminated by seasonal variation. Moreover, since she compares the price changes of airport-pair routes only before and after the merger, the identification strategy relies on a single time series difference. Although she tries to use changes in the market's weighted unemployment rate as a control variable for time-varying unobserved route characteristics, industry-wide factors, such as changes in costs, as well

as economy-wide factors, that may influence airfares cannot be captured simply by the unemployment variable.

2.2. History of united/continental airlines merger

Following the May 3, 2010, United Airlines and Continental Airlines publicly announced a merger agreement with an aim to generate savings of more than \$1 billion per year. The merger made United/Continental Airlines the largest airline in the world at that time.⁵ On August 27, 2010, the U.S. Department of Justice (DOJ) approved United/Continental Airlines merger based on an antitrust review that concluded the small number of overlap routes between these airlines would allow a merger to generate a significant amount of efficiency gains for consumers. However, in order to secure this approval from the DOJ, United and Continental Airlines agreed to lease slots at Newark Liberty International Airport—18 take-off and 18 landing slots—to Southwest Airlines. On September 2010, the merger was approved by shareholders of both companies, but it took almost two years for United Airlines and Continental Airlines to finalize their merger. In practice, in 2011, both airlines began to merge their operating systems, and by November 30 of that year, these two carriers were no longer operating as separate airlines. On March 2012, as Continental's reservation system and mileage program were merged into United's, the merger was officially finalized. The merged airline is named United Airlines, and serves up to 370 destinations with 10 airport hubs.⁶

3. Data

The core data of this paper come from the Department of Transportation's Airline Origin and Destination Survey (DB1B) files from the first quarter of 2006 through the final quarter of 2013. DB1B files contain a 10% quarterly sample of all domestic airline tickets, and include three different sub-components: market, coupon, and ticket databases. The ticket database includes origin airport, number of coupons, airfares, number of passengers, itinerary distance, and other information; however, the ticket database does not include destination airport. Therefore, I have merged the ticket database with the coupon database by "itinerary id" to enable the construction of origin-destination pair routes.

Although it took more than one year for United/Continental Airlines to finish their merger, this empirical analysis assumes the announcement date (2010, Q2) as the starting point for the merger event. However, I will also decompose the effects by period to see whether the effects vary between the quarters in which they announce the merger and the quarters in which they finalize the merger. The merger has heterogeneous impacts on different routes—for instance, the overlap routes that both United Airlines and Continental Airlines offered before the merger are more affected, while non-overlap routes previously offered by only one of the airlines or neither of the airlines are less affected. Based on such restrictions, I divide the sample into two mutually exclusive route categories: overlap routes (indicated by a dummy variable) and non-overlap routes.⁷ Moreover, in order to alleviate the contamination that might be induced by the merger between Delta and Northwest Airlines during this

⁵ Before the merger of United/Continental, Delta/Northwest is the largest airline over the world. However, the announcement of a merger between American Airlines and US Airways made United/Continental Airline the second largest airline in 2013.

⁶ The 10 airport hubs are Antonio B. Won Pat International Airport (GUM), Cleveland Hopkins International Airport (CLE), Denver International Airport (DEN), George Bush Intercontinental Airport (IAH), Los Angeles International Airport (LAX), Narita International Airport (NRT), Newark Liberty International Airport (EWR), O'Hare International Airport (ORD), San Francisco International Airport (SFO), and Washington Dulles International Airport (IAD).

⁷ Specifically, I define the routes where both the United and Continental were present in one quarter before the second quarter of 2010 (merger announcement date) as overlap routes. All other routes are defined as non-overlap routes.

⁴ At least one airline involved in the merger is low-cost carrier.

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