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MASTER IN MANEGEMENT (MIM)

MASTER FINAL WORK

THE EFFECT OF PRICE AND NON-PRICE INCUMBENT REACTIONS ON A LOW-COST CHALLENGER'S TIME TO EXIT FROM THE MARKET: AN EMPIRICAL REASSESSEMNT OF THE US AIRLINE MARKET AND THE GERMAN BUS MARKET

DOMAS JUNČA

SUPERVISOR: CARLOS JORGE DA SILVA LOURENÇO

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Abstract

This thesis investigates the dynamics of entrant survival in the airline and bus industries, focusing on the influence of incumbents' marketing strategies. Drawing on previous literature, I explore how pricing, product variety, and quality impact an entrant's time to exit the market. The findings reveal that incumbents' pricing strategies, particularly shallower price cuts, significantly affect entrants' survival, with implications for market competition and stability. Aggressive price-cutting strategies can drive increased survival rates by signaling a valuable market worth defending. Additionally, product differentiation plays a strategic role, with investments in product quality potentially offering a competitive advantage for incumbents. The study contributes to a deeper understanding of market dynamics and offers insights for managerial decision-making and policy formulation in competitive industries. By analyzing alternative tools beyond pricing, the study sheds light on effective strategies for incumbents to defend their market positions against low-cost entrants.

KEYWORDS: *Incumbent defence, hazard model ,new entrant, low-cost carrier, Southwest, entry and exit.*

Abstrat

Este artigo investiga a dinâmica de sobrevivência dos entrantes nos setores de aviação e ônibus, com foco na influência das estratégias de marketing dos operadores históricos. Com base na literatura anterior, exploro como o preço, a variedade de produtos e a qualidade impactam o tempo de um entrante sair do mercado. As conclusões revelam que as estratégias de preços dos operadores históricos, especialmente reduções de preços mais superficiais, afectam significativamente a sobrevivência dos novos operadores, com implicações para a concorrência e a estabilidade do mercado. Estratégias agressivas de redução de preços podem aumentar as taxas de sobrevivência, sinalizando um mercado valioso que vale a pena defender. Além disso, a diferenciação dos produtos desempenha um papel estratégico, com os investimentos na qualidade dos produtos oferecendo potencialmente uma vantagem competitiva para os operadores históricos. O estudo contribui para uma compreensão mais profunda da dinâmica do mercado e oferece insights para a tomada de decisões gerenciais e formulação de políticas em indústrias competitivas. Ao analisar ferramentas alternativas para além da fixação de preços, o estudo lança luz sobre estratégias eficazes para os operadores históricos defenderem as suas posições de mercado contra concorrentes de baixo custo.

PALAVRAS-CHAVE: Defesa incumbente, modelo de perigo, novo entrante, transportadora de baixo custo, Sudoeste, entrada e saída.

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1. Introduction

Low-cost carriers pose a substantial challenge to traditional "full-service" airlines due to the latter's high-cost structure, which limits their ability to compete effectively on price—a crucial factor for most consumers when selecting a carrier. During the tumultuous period from 2001 to 2003, marked by terrorism, war, and the SARS epidemic, the majority of traditional airlines suffered significant losses, while low-cost carriers generally remained profitable. The emergence of low-cost airline carriers originated from the deregulation of the air transportation sector in the 1970s, spearheaded by the United States. The genesis of low-cost airline carriers can be traced back to the deregulation of the air transportation sector in the 1970s, spearheaded by the United States. Since its inception, the low-cost carrier model has evolved beyond its origins in the US, with pioneers like Southwest and JetBlue, to proliferate across Europe through the likes of Ryanair, easyJet, and Buzz. Furthermore, this model has ventured into diverse regions such as Asia and Africa, boasting carriers like AirAsia, Virgin Blue, Air Arabia, and Kulula, thereby cementing its global footprint.

The influence of low-cost carriers on both fares and passenger traffic has been extensively explored in prior research. (Whinston and Collins, 1992) observed a 34 percent decline in mean prices on 15 routes during 1984-85 following the entry of the low-cost carrier People Express. (Bennett and Craun's, 1993) study for the United States Department of Transportation focused on the impact of Southwest Airlines on various

California markets, revealing a 55 percent price drop and a sixfold surge in passenger traffic when Southwest entered the Oakland-Burbank intra-California route in 1990. Windle and Dresner (1995) found, using data from 1991 to 1994, that Southwest's entry led to an average price decline of 48 percent and a 200 percent increase in traffic. Richards (1996) identified variations in pricing strategies among carriers on routes where Southwest competed, where Southwest operated as a potential entrant (serving one of the endpoints), and on routes where Southwest was not considered a potential entrant. The study concluded that the presence of Southwest, whether as an actual or potential entrant, negatively influenced yields. A more recent analysis by Dresner et al. (2017) examining the top 200 US domestic routes demonstrates that the presence of low-cost carriers results in significant yield reductions and heightened traffic on both the entry route and competitive routings. In summary, the extensive body of literature regarding new entry points convincingly highlights the influence of low-cost carriers on both prices and traffic upon entering routes. This master thesis aims to investigate how traditional carriers ("incumbents" hereafter) can effectively navigate the challenges posed by low-cost carriers entrants ("entrants" hereafter) through price and non-price strategies, specifically emphasizing product variety and quality.

In this thesis, I attempt to understand better the dynamics of entrant survival in the industry, with a focus on the impact of incumbents' marketing strategies on entrant deterrence. I link the time-to-exit of a new low-cost market entrant to incumbents' price, product variety, and product quality strategies which, according to Hansen, Liu (2018) and Avogadro et al, (2021) play crucial roles in market competition among any carriers. Drawing on previous literature on entry and exit decisions by managers as well as on strategies used in various industries to deter an

entrant, I expect that while certain pricing strategies will be effective in pushing entrants out of the market, the product variety, quality, and frequency strategies might prove to be valuable as well for incumbents when facing an entry, especially of an low-cost carrier.

The results of the study shed light on the intricate relationship between incumbents' marketing strategies and entrant survival in both the airline and bus industries. The findings reveal that incumbent pricing strategies, particularly shallower price cuts, can significantly impact entrants' market survival, with implications for market competition and stability. While price reductions by incumbents may signal a more uncertain market environment, thereby hastening entrants' exit, aggressive price-cutting strategies can also drive increased survival rates by portraying a more valuable market worth defending. Moreover, the study highlights the strategic importance of product differentiation in influencing entrants' survival, with investments in product quality potentially offering a competitive advantage for incumbents.

These insights contribute to a deeper understanding of market dynamics and offer valuable implications for both managerial decision-making and policy formulation in competitive industries.The significant influence of incumbents' pricing strategies on entrant survival underscores the pivotal role of pricing decisions in shaping market competitiveness. Managers are advised to carefully balance profitability with market attractiveness, considering the signaling effects of price changes on entrants. Moreover, the strategic importance of product differentiation in influencing entrants' survival highlights the need for incumbents to invest in product quality while avoiding inadvertently creating opportunities for low-cost entrants.

The thesis is structured as follows: First, I delve into the existing literature on the significance of industry entry and exit, the challenges and barriers faced by potential entrants, factors influencing exit decisions, and strategies employed by incumbents to deter entrants. Second, I detail the dataset utilized for empirical analysis and introduce the chosen model. Third, I present

the findings of the empirical analysis. Lastly, I discuss the implications of these findings and offer insights for managers and policy makers regarding the adoption of strategies for defending their market positions.

While this study offers valuable findings, it has limitations, including a focus on only two product variables and the exclusion of exit barriers, which future research could address by exploring additional product quality variables, loyalty programs, and the impact of second market entry attempts by low-cost carriers.

2. Literature review

Economists have long acknowledged entry as a crucial catalyst for enhancing efficiency. This viewpoint is evident in various policies, such as free trade agreements and the Horizontal Merger Guidelines (1997), which underscore the significance of assessing entry potential in merger evaluations. The ease of entry and exit is arguably critical for fostering effective competition. According to Eaton and Ware (1987) entry and exit, fundamental concepts in neoclassical theory, are considered the primary drivers of competitive markets. In the long run, market equilibrium is achieved when potential entrants do not perceive entry as profitable, and established firms do not find exit profitable. This straightforward yet compelling narrative of no entry and no exit encapsulates much of the theory of equilibrium in competitive markets. Moreover, as noted by Church and Ware (2000), effective competition requires entry that is timely, probable, and substantial. Overall, the entry and exit processes drive competition within the industry, which in turn reduces prices and costs, ultimately resulting in improved welfare.

Entry and exit play pivotal roles across virtually all industries, not only influencing the pricing dynamics discussed earlier but also shaping market composition and the competitive behaviors exhibited by firms. However, the process of entry is often fraught with challenges, as many markets lack full contestability, presenting aspiring entrants with challenging barriers to navigate (Shubik, M. & Levitan, R. 1980). These barriers, whether structural or behavioral, pose significant obstacles for newcomers attempting to establish themselves within a specific market landscape. As highlighted by Siegfried & Evans (1994), barriers to entry manifest in two primary forms: Firstly, absolute cost barriers, which typically arise in the form of sunk costs associated with machinery, buildings, and other specialized equipment, imposing financial burdens on potential entrants. Secondly, strategic barriers originate from the operations of multiplant incumbent firms, leveraging economies of scale or scope across multiple plants to achieve lower average production costs compared to single-plant entrants. Thus, the complexities surrounding entry and, to some extent, exit, are integral elements in driving transformative shifts within industries, shaping their competitive trajectories.

According to Ansic and Pugh (1999) upon successfully entering the market, ensuring sustained survival remains highly uncertain. And there are instances where managers persist in operations despite generating a subpar rate of return. Numerous factors may contribute to this decision, including reluctance to exit the market or divest from a product or strategic business unit experiencing diminished profits or even losses, with barriers to exit serving as one such factor. A company's choice to withdraw from the market hinges significantly on the anticipated present value of staying in the market. The firm will opt for an exit only when current losses surpass the present value of anticipated profits. Nargundkar, Karakaya, and Stahl (1996) identify six primary barriers to exiting: operating fit, marketing fit, cost of divestment, forward vertical integration, backward vertical integration, and number of years of association of the business

unit with the firm. Another barrier to exit, per Kong Chow & Hamilton (1993) is the attitudes of managers themself. It's a common human inclination to seek ways to enhance company performance, so managers often invest more resources in revitalizing the business before contemplating an exit strategy. Navigating the complexities of market entry and survival involves weighing various factors, including managerial attitudes and barriers to exit, to make informed decisions aimed at optimizing company performance and longevity.

Considering all possible entry and exit barriers the decision to exit the market has to be well thought out and weighted decision of the managers and according to the literature, there could be different reasons that might lead a manager to a decision to leave a market. According to a Business Week ("Flops," 1993), which referenced a study examining 11,000 newly introduced products, merely 44% of those items maintained their presence in the market five years later. The literature on new product development further illustrates this precarious landscape, with failure rates ranging from 37% to 80% (Karakaya & Kobu, 1994). Several reasons may lead the company to a decision to exit the market. An empirical study conducted by (Kim et al. 1999) demonstrates that competition can often lead managers to contemplate exiting the market. This sentiment is echoed by Woo (1984), who argues that companies with low market share are typically the ones forced to exit, underscoring how heightened market competition can raise pressure on entities with smaller market presence. When faced with intense competition, companies may find themselves compelled to withdraw from the market if their products struggle to gain traction. Avlonitis (1983) elucidates that product failure or inadequate product design stands out as a primary catalyst for either product elimination or market departure. Furthermore, strategic fit emerges as another pivotal consideration in the discourse surrounding market exit. Managers are tasked with assessing how well specific markets align with the broader strategic objectives of the company. The importance of strategic alignment, often

referred to as synergy, was explored in earlier research by Buzzel (1979), whose findings underscored the positive correlation between synergy resulting from relatedness and profitability, particularly within consumer goods sectors. The decision to exit a market necessitates meticulous deliberation and evaluation by managers, as evidenced by a vast body of literature delving into factors such as competition, product viability, and strategic alignment. A considerable body of management research literature in the domain of market entry has concentrated on the strategies employed by incumbents to deter entrants. Numerous studies have highlighted pricing as a primary tool in the incumbents' toolkit to counteract the entry of new competitors. The specific pricing strategy chosen plays a pivotal role in determining the incumbent's market position and influencing the entrant's decision to remain in or exit the market. In the context of the airline industry, several studies, including those by Ciliberto & Tamer (2009), Morrison (2001), and Joskow et al. (1994), have identified that the entry of new competitors often triggers price-cutting battles, capacity expansion initiatives, and efforts to differentiate on quality. The strategic use of price reduction, in particular, varies when defending or attempting to penetrate the market. According to Karakaya and Yannopoulos (2011), incumbent firms are inclined to implement defensive measures when the market entrants' prices align with their own, whether in pre or post-market entry scenarios. Their study further indicates that incumbent firms, or firms responding to market entry, are more prone to take defensive actions when facing larger competitors or competitors offering innovative products—conditions commonly observed in instances of new market entry. Aghaie et al. (2022) counterintuitively argue that lowering prices in response to entry decreases the likelihood of entrants exiting the market. Additionally, Luoma et al. (2018) demonstrate that firms employing low-price market entry strategies can effectively modulate the strength of incumbent reactions by strategically signaling either high aggressiveness or low commitment.

The extensive research on market entry strategies underscores the pivotal role of pricing tactics employed by incumbents to deter new entrants, with studies emphasizing the significance of pricing in shaping market dynamics and influencing both incumbents' and entrants' decisions. Contrary to the US Department of Transportation's (1996) assumptions that incumbent carriers balance price reductions on routes with entrant competition by raising prices on routes without low-cost carrier competition, Robert Windle and Martin Dresner (2017) argue that incumbents, likely already maximizing profits on a route-by-route basis, cannot offset revenue declines from increased competition on one route by raising prices on another route. This naturally forces one to look for an alternative tool that incumbents could use to combat entrants in light of the potential profit losses incurred through price-cutting. Researchers across different industries considered the idea of entry deterrence through non-price, product-related differentiation strategies. Anthony Cookson's (2018) research suggests that when casinos face new competition, they invest more in their facilities, which can help keep competitors out. García-Fernández et al.'s (2018) study of Spanish fitness centers shows that what customers care about most is how good the quality is and how easy it is to use the services. They also want any problems to be fixed quickly. These findings demonstrate how focusing on product-related strategies can make customers feel like they're getting a better deal. Obeng et al. (2016) looked at how the size and uniqueness of services offered by existing businesses affect their sales when new competitors arrive. They found that successful businesses set themselves apart by offering lots of unique services. To stay competitive, businesses need to keep innovating, offering services that others don't, and showing customers that they're the only ones who can provide those services. Having something special to offer can lead to a decrease in annual sales losses, ranging from 2.2% to 7.9%, depending on the type of business and the new competition.

In conventional retail, the dimensions of product variety and quality are intricately linked with time. Concerning product variety, retail firms frequently distinguish themselves based on business hours or opening times, known as "time-saving shopping convenience." Similarly, in the airline industry, differentiation occurs through flight frequency, providing consumers with a selection of flights that vary throughout the day, week, and/or time of the year. In the realm of time-based product quality, retailers in the traditional industry often differentiate based on in-line waiting times for brick-and-mortar establishments, while both online and traditional retailers emphasize on-time delivery. Similarly, in the airline industry, carriers frequently vie for customers based on the punctuality of their flight departures and arrivals. Building on this principle and drawing from previously reviewed literature, I empirically aim to demonstrate that incumbents, when confronted with the threat of an entrant, can deploy non-price-related strategies alongside price-related strategies to deter entry or safeguard their market positions.

Overall, the literature emphasizes the multifaceted nature of entry and exit decisions, underscoring the importance for firms to strategically navigate these processes to sustain competitiveness and improve market performance. While current studies spotlight pricing as the primary tool for airlines to deter entrants, research across various industries suggests the effectiveness of alternative, behavioral strategies in defending market positions.

3. Empirical analysis

3.1. Data source and industry context

In theory, an incumbent can employ various competitive tactics, including pricing adjustments, capacity management, and quality differentiation, in response to a potential entrant. However as reviewed previously, other than pricing strategies are seldom used in the airline industry. The empirical analysis uses U.S. airline industry data to explore possible effects of independent variables representing behavioral and non-behavioral marketing strategies to defend the market. The airline industry serves as an ideal context for this study due to its structure: each route between two airports represents a distinct market, characterized by frequent entries and exits that are easily observable. Moreover, the identification of both entrants and established incumbents is well-established within this industry. My dependent variable of interest is the time of exit of a low-cost airline from a city-pair market in a particular, given entry into that market.

The empirical analysis relies on data spanning from the first quarter of 1997 to the fourth quarter of 2016, encompassing market details, carrier characteristics, and marketing activities. Focusing on 11 carriers, including Delta, American, United, Continental, Northwest, and US Airways as major carriers, and AirTran, Southwest Airlines, JetBlue, Frontier, and Spirit as low-cost carriers, the analysis delves into the market survival of the low-cost group. Working with 11 carriers virtually means working with entire market (90%) and getting better picture of the market. To ensure meaningful resource investment by carriers in each route, quarterly observations are considered only when a carrier transports a minimum of 500 passengers (approximately 42 passengers per week, on average). Routes with no other low-cost incumbents at the time of entry are selected to eliminate major vs. low-cost incumbent variations. The dependent variable of interest in the analysis is the time it takes the entrant to exit the market where the incumbent operates and is measured in quarters. The entrant's status is observed in

each quarter, tracking whether it exited the market or remained in it. Market exit is defined as when an entrant has not operated in that market for two quarters in a row. The analysis encompasses 11,072 observations, spanning 77 quarters (19 years) and involving 859 market entries by any one of the five low-cost carriers (which amounts to 39.70% of all entries; i.e., the remaining 60.30% of the entries in the data refer to entries by major carriers).

3.2. Hazard-based duration model

In this econometric hazard-based duration model, an entrant's time-to-exit (TTE) is determined by a baseline hazard function, which outlines the likelihood of an entrant exiting in period t (provided it did not exist in t-1), along with marketing variables and a range of controls that influence the baseline hazard function's probability (both types of variables are elaborated upon below). A hazard-based duration model leverages data on markets where entrants have stayed until the end of the observation period. It offers an evaluation of the comparative significance of market and firm attributes while addressing any duration dependence present in the dataset ((Dixit and Chintagunta 2007). Incorporating insights from Eilert et al. (2017), I opt for an accelerated failure time (AFT) formulation. This allows to interpret linkage between the timing patterns of interest and marketing mix or differentiation variables directly, thus enhancing the interpretability of the parameter estimates representing the impacts of the independent variables in the model. In the AFT model, a positive estimate for the effect of an independent variable indicates that an independent variable increases an entrant’s survival, and a negative estimate

for the effect of an independent variable indicates that an independent variable decreases an entrant's survival. Therefore, the model is structured as follows:

$$
\begin{aligned}
TTEi \;=\; [-logS(t)]\, exp\,\{&\beta 0 \;+\; \beta 1 IncPriceChange_{it} \;+\; \beta 2 IncPriceCut_{it} \\
&+\; \beta 3\, IncPriceChange_{it} \times IncPriceCut_{it} \;+\; \beta 4 ChPostEntryPrice_{it} \\
&+\; \beta 5 ChPriceCut_{it} \;+\; \beta 6 IncProductVariety(Frequency)_{it} \\
&+\; \beta 7 IncProductQuality(Delay)_{it} \;+\; \beta 8 FuelPrice_{t} \\
&+\; \beta 9 IncRouteImportance_{it} \;+\; \beta 10 Leisure_{i} \\
&+\; \beta 11 ChRouteImportance_{it} \;+\; \beta 12 SecondEntry_{i} \\
&+\; \beta 13 MarketDemand_{it} \;+\; \varepsilon_{it}\}
\end{aligned}
$$

In the model, the subscript i refers to route and t refers to quarter. Therefore, variables with subscript it vary across routes and over time, variables with only subscript i vary only across routes, and variables with only subscript t vary only over time. TTE represents the time it takes for an entrant to exit the market. The function $logS(t)$ is the baseline survival function and the function exp {} includes the variables of interest. $IncPriceChangeit$ quantifies the extent of price changes among incumbents compared to the previous quarter. $IncPriceCutit$ is a binary variable distinguishing whether there was a price cut and rise among incumbents compared to the previous quarter. $ChPostEntryPriceit$ reflects the entrant's price in each quarter, while $ChPriceCutit$ serves as a binary indicator of price changes among entrants relative to the previous quarter. Additionally, $IncProductVariety(Frequency)it$ and $IncProductQuality(Delay)it$ denote the range and quality of products offered by incumbents, respectively.

The variables just mentioned are defined according to the operational descriptions provided below.

3.3. Price variables

I define $IncPriceChangeit$ as the ratio of incumbents' post-entry average price in the current period *t*, *IncPostEntryPricet*, to their average post-entry price in the previous period t-1, *IncPostEntryPricet*-1. This chained operationalization is free from seasonal variations and, like any index, it has only ordinal information. This operationalization yields ordinal information, and to determine if a price cut occurs in period t, I employ *IncPriceCutit*, a binary variable. *IncPriceCutit* equals 1 if *IncPostEntryPricet* is lower than *IncPostEntryPricet*-1, and 0 otherwise. To address potential differences in the effects of price indices based on price change direction, I introduce the interaction term *IncPriceChangeit×IncPriceCutit*, using mean-centered price indices to alleviate 'micro' multicollinearity concerns (Iacobucci et al. 2016). As discussed above, all else equal, I anticipate a positive impact on an entrant's market survival from quarterly price changes (the higher the incumbents' price increases or the lower the incumbents' price cuts) among incumbents, indicative of heightened competitiveness. Conversely, periods with price cuts are expected to prolong an entrant's market survival time, which is interpreted as evidence of a price-signaling effect. Additionally, I consider *ChPostEntryPriceit*, the entrant's average price in period t, and *ChPriceCutit*, indicating if the entrant cut prices relative to the previous period. Given the lower average prices of entrants

compared to incumbents – the average price is 27% lower, the standard deviation is 28% lower, and the average minimum price, at $37, is 35% lower –, reducing prices may further strain margins, potentially compromising market survival. Dollar prices are normalized to account for route length discrepancies, and weighted averages are computed using incumbents' market shares to preserve relative competitive strength. Log transformations are applied to price and non-price variables following standard econometric practices, particularly when dealing with skewed distributions.

3.4. Product variables

In the service sector, particularly for non-separable services requiring customer presence during delivery and consumption, enhancing product variety involves offering services across various time slots. This strategy, as evidenced by research (Collier and Sherrell 2010), allows firms to cater to diverse customer schedules, ultimately reducing delays experienced by passengers, as demonstrated in studies by Hansen and Liu (2015). Schedule delays, reflecting the variance between desired and actual departure times, significantly influence airline selection, given travelers' time sensitivity (Shaw, 2016). Hence, airlines can enhance product variety by increasing flight frequency overall (Berry and Jia 2010; Brueckner et al. 2013), particularly during peak times (Huse and Oliveira 2012). Similar to the approach with pricing, I operationalize incumbents' product variety by computing the ratio of their average post-entry flight frequency in the current period to that of the previous period ($\beta 6 IncProductVariety(Frequency)it$).

Quality assessment in the airline industry often revolves around on-time performance, a key determinant highlighted in the marketing literature (Grewal, Chandrashekaran, and Citrin 2010) and trackable at the route level (Prince and Simon 2015). To capture this aspect, I introduce the variable *IncProductQuality*(Delay)it, derived from the market-share weighted average of incumbents' flight punctuality. Alongside these measures, the econometric analysis incorporates controls to address potential confounding factors.

3.5. Control Variables

The control variables included in this model are designed with the specific intention of comprehensively capturing a range of factors, namely market characteristics, network structure, and carrier-, quarter-, and year-fixed effects, thereby providing a robust framework for understanding and analyzing the dynamics of the system under investigation. As fuel expenses represent a significant portion of airlines' operational costs, constituting nearly 20%, I incorporate the quarterly average fuel prices, denoted as *FuelPricet*, into the model. In the airline sector, events such as market entries, exits, and timing are interconnected across different markets due to the inherent connectivity of geographical markets facilitated by routes linking airports. Additionally, certain airports serve as central hubs, further emphasizing this interdependence. To address the interdependence among various markets and the potential cascading effects of information from any of them, I incorporate controls in the econometric model for both the new entrant's and the incumbents' route centrality, denoted as *IncRouteImportanceit* and *ChRouteImportanceit*, respectively. Additionally, a dummy

variable named *Leisurei* is employed, which assumes a value of 1 if either endpoint of a route represents a beach or outdoor destination, and 0 otherwise. This variable serves as a proxy for the typical traveler types (business versus leisure) along that route, as well as the associated seasonality that may influence the timing of a carrier's market exit decision. Furthermore, considering the potential scenario where another low-cost new entrant might join a market prior to the exit of the initial entrant, and recognizing that this subsequent entry, originating from a close competitor, could significantly impact the timing of the first entrant's exit, I incorporate a dummy variable, $SecondEntryi$, into the model. This variable takes a value of 1 if a second low-cost new entrant enters the market, and 0 otherwise. For controlling route demand, I employ the geometric mean of the population in the cities at the endpoints of that route, denoted as $MarketDemandit$.

4. Results

4.1. Airline Industry Model

Table 1 presents the results of the AFT hazard-based duration model that estimates the impact of incumbents' price- and non-price marketing strategies on the entrant's market survival. Results for the fixed effects are omitted for the sake of space. As previously noted, when employing an accelerated failure time model, a positive (negative) estimate associated with an independent variable signifies that the said variable boosts (diminishes) the survival rate of an entrant. In the subsequent section, I present and analyze the findings related to price-related

actions, followed by non-price marketing actions and control variables (refer to Table 1). The model was estimated in STATA.

Table 1 Effect of Incumbents' Post Entry Strategies on the Entrant's Survival (Airline Industry)

Variables	**Coefficients**	**S.E.**	**p-value**
IncPriceChange	-0.583	0.521	0.263
IncPriceCut	2.525**	1.045	0.016
IncPriceChange × IncPriceCut	-0.470**	0.193	0.015
ChPostEntryPrice	-0.258*	0.149	0.083
ChPriceCut	-0.328***	0.085	0.000
IncProductVariety(Frequency)	-0.333**	0.145	0.022
IncProductQuality(Arrive late)	1.375***	0.364	0.000
FuelPrice	-0.588***	0.100	0.000
IncRouteImportance	-0.848	0.962	0.378
Leisure	0.099	0.097	0.307
ChRouteImportance	3.285***	0.535	0.000
SecondEntry	-0.740**	0.224	0.001
MarketDemand	0.413***	0.088	0.000

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The significant coefficient for $\beta IncPriceCutit$ ($\beta IncPriceCutit = 2.525$, $p > 0.05$), which may seem counterintuitive at first glance, indicates that price cuts by incumbents significantly enhance the market survival of entrants. This finding suggests that entrants perceive markets as

considerably more attractive when incumbents implement price reductions; in other words, the positive IncPirceCut results imply a favorable "price signaling" effect on a new entrant's market survival. On the other hand, $\beta IncPriceChangeit$ ($\beta IncPriceChangeit$ = 0.583, p > 0.1) does not achieve statistical significance; however, the presence of significant effects for price cuts supports the notion that such actions by incumbents positively impact the survival of entrants. Quarters characterized by observed price cuts by incumbents exhibit notably higher survival rates compared to those with price increases. Simultaneously, the interaction variable $\beta IncPriceChangeit \times IncPriceCutit$ = -0.470, p > 0.05) provides further support for the idea that the depth of price cuts may inversely affect entrant survival; deeper cuts potentially result in lower survival rates.

Moreover, reducing prices appears to negatively influence the duration until an entrant exits the market ($\beta ChPriceCutit$ = -0.328, p < 0.01 and $\beta ChPostEntryPriceit$ = -0.258, p < 0.1), indicating that challengers may engage in price competition for a brief period before encountering long-term profitability challenges.

Additionally, the results suggest that product-based strategies have also impacted the new entrant's exit timing. Specifically, higher incumbents' product variety (frequency) decreases survival time ($\beta IncProductVariety(Frequency)$= -0.333, p < .05), while poorer product quality (higher delay) increases survival ($\beta IncProductQuality(Delay)$ = 1.375, p < .01). In summary, while price cuts by incumbents enhance an entrant's market survival, the magnitude of price changes may influence the duration until exit, albeit with less certainty.

4.2. Bus Industry Model

To bolster the findings, I analyze the bus industry in Germany using data sourced from busliniensuche.de, a prominent online platform for interurban bus and train travel in the country. This dataset encompasses travel dates, providers, routes, departure frequencies, number of stops, trip durations, and prices from September 5 to December 11, 2017. As in the previous analysis, each route is treated as a distinct market. Following the methodology outlined by De Haas et al. (2018), a "route" refers to every unique connection between two cities (e.g., Hamburg to Munich), with separate counts for outbound and inbound trips. If a provider offers the same route multiple times per day, the data is aggregated at the provider level daily. The finalized dataset comprises 202 market entries, of which 141 culminated in exits. In the context of bus data, I designate D-Bahn as a major incumbent due to its long-standing presence, faster service, and higher punctuality. Conversely, Flixbus is classified as a new low-cost entrant, given its recent establishment and focus on budget-friendly transportation. Notably, primary findings are reaffirmed across different industries and within a distinct geographic market and cultural context.

The overall findings of the bus data model exhibit striking resemblances to the previous model using airline industry data. Both models suggest nearly identical effects of the primary price variables. In the Bus Model, incumbent's shallower price cuts are linked to shorter survival times for entrants. Similar to the airline model, this phenomenon could be explained by the notion that unclear signals from incumbents prompt entrants to make faster exit decisions ($\beta IncPriceChangeit$ = -1.12, $p < .01$).

Conversely, the Bus Model presents contrasting suggestions regarding challenger prices ($\beta ChPostEntryPriceit$ = 0.20, p > 0.10 and $\beta ChPriceCutit$ = -0.10, p > 0.10) compared to the Airline Model. These differences may be attributed to variances in markets/countries and the involvement of low-cost challengers. Furthermore, there's a statistical argument here: while incumbents are aggregated in both the airline and bus datasets, the low-cost challenger represents a single entity (Southwest in the airline data and FlixBus in the bus data).

In contrast, enhancements in incumbent product quality ($\beta IncProductQuality$ = 0.020, p < 0.01) seem to have a marginal positive impact on entrant survival in the market. This scenario could be attributed to the positioning strategy of the incumbent. As the incumbent improves quality and establishes itself as a premium carrier, it inadvertently creates an opportunity for the entrant to attract customers seeking low-cost services. Consistent with discoveries in the US airline industry, increased product variety is correlated with decreased survival ($\beta IncProductVariety$= -0.81, p < .001). These results are elaborated in Table 2.

Table 2 Effect of Incumbents' Post Entry Strategies on the Entrant's Survival (Bus Industry)

Variables	Coefficients	S.E.	p-value
IncPriceChange	-1.120***	0.310	0.000
IncPriceCut	0.300	0.190	0.130
IncPriceChange × IncPriceCut	-0.560*	0.280	0.050
ChPostEntryPrice	0.200	0.210	0.330
ChPriceCut	-0.100	0.240	0.670
IncProductVariety	-0.810***	0.240	0.000
IncProductQuality	0.020***	0.000	0.000

* p < 0.10, ** p < 0.05, *** p < 0.01

5. Discussion

5.1. Research Contributions

This empyrical study explores the connection between incumbents' marketing strategies and the time it takes for a new entrant to exit the market, offering fresh insights into entry and exit dynamics while considering additional factors that could affect market survival. The findings indicate that incumbents' marketing approaches regarding price, product variety, and quality

influence when a new entrant exits. However, the impact could vary based on the type, scale, and direction of defensive responses. It appears that incumbents' price reductions in response to low-cost entrants might not yield straightforward outcomes; instead, the effects depend on a balance between positive signaling and negative demand-side impacts. On the other hand, non-price product strategies might consistently prove more effective in deterring low-cost entrants.

5.2. Managerial and Policy Implications

The results of the study offer valuable insights for both managerial decision-making and policy formulation in the airline and bus industries. Specifically, the significant impact of incumbents' pricing strategies on entrant survival underscores the importance of pricing decisions in shaping market dynamics. Managers should carefully consider the implications of price changes on the entrant decisions, as observed shallower price cuts by incumbents may signal a more uncertain market environment for entrants, potentially hastening their exit. Conversely, price cuts by incumbents could paint a picture of a more valuable market that is worth defending from entrants, leading to increased survival rates. Therefore, managers need to strike a balance between pricing strategies that maintain profitability and those that signal market attractiveness to potential entrants. Additionally, the findings highlight the strategic importance of product differentiation strategies in influencing entrants' survival. While heightened product variety may decrease the survival rates of an entrant, investments in product quality could offer a competitive advantage for incumbents. However, managers must be cautious about inadvertently creating opportunities for low-cost entrants by positioning themselves as premium carriers.

From a policymaker perspective, these findings underscore the importance of fostering competition while ensuring market stability. Policymakers should strive to create an environment that encourages innovation and entry while also safeguarding against anti-competitive practices that may hinder entrants' ability to survive in the market. Antitrust laws serve as a safeguard against anti-competitive practices and shield firms from predatory behavior, particularly in response to market entries. Predatory pricing, as defined by marketing scholars, involves deliberate price cuts by incumbents, often below cost or at unsustainable levels, to drive entrants out of the market (Guiltinan and Gundlach, 1996). The results indicate that implementing moderate price reductions in response to market entry does not consistently diminish competition, at least not in the short term. Nonetheless, policymakers may still view aggressive price-cutting strategies with concern, given that such tactics have been demonstrated to drive entrants out of the market. Furthermore, policymakers should consider the implications of price signaling effects on market dynamics when formulating regulatory frameworks. Overall, the insights gleaned from these analyses can inform both managerial strategies and policy interventions aimed at promoting competition and enhancing market efficiency in the airline and bus industries.

6. Conclusion

While in prior research pricing, related strategies were analyzed as the main tool of incumbents to deter entrants this study aims to investigate what alternative tools might be used by incumbents to defend their market. The primary purpose of this study is to explore two different data sets and examine the link between different incumbents' marketing strategies and an entrant's time to exit at the market level.

The study provides valuable insights into the dynamics of entrant survival in both the airline and bus industries, shedding light on the impact of incumbents' marketing strategies on market competition. The findings contribute to the existing literature by highlighting the nuanced effects of pricing and product differentiation strategies on entrant survival. I find that price cuts might signal to the entrants that the market is worth defending this way lengthening its market survival while no price cuts or even price increases would send mixed signals thus pushing the entrant closer to an exit decision. By analysing the product-related variables such as product variety, frequency, and quality, I noticed that all three might have a significant effect on entrant decisions to leave the market. While increasing the frequency and variety of the product pushes an entrant towards an exit decision the third one - quality, might work just the opposite by creating an opportunity for the incumbent to occupy the low-cost carrier position more obviously thus prolonging its market survival.

6.1. Limitations

While this study presents valuable findings, it also has several limitations that should be considered. First, the thesis focuses on two main product variables: IncProductVariety (Frequency) and IncProductQuality (Arrive Late). However, many other product quality variables could be investigated and explored in future research, such as customer service quality, in-flight amenities, and overall passenger experience.

Second, while the thesis considers the impact of a second entry, more emphasis could be placed on this variable. Future research could delve deeper into the dynamics and outcomes of a second market entry attempt by low-cost carriers, examining how resilience to incumbent defense strategies might evolve over time.

Third, the thesis does not account for exit barriers when considering the time to exit for new entrants. A thorough analysis of exit barriers and how they influence entrant strategies could provide valuable insights into market dynamics. This aspect should be considered for future research to enhance understanding in this academic field.

By addressing these limitations, future studies can build on the current findings and offer a more comprehensive view of the factors influencing entrant survival and market exit in the airline industry.

6.2. Venues for Future Reasearch

Following limitations of the study several potential venues for future research could be. identified. This study has focused on three main product variables affecting the entrant's decision to exit the market. Further research could consider a broader scope of potential variables product-related variables, such as the possible connection options in arrival airports, lounge quality, customer service, or another outside-the-plane service that influences the overall experience of the passenger. A loyalty program is another interesting product-related strategy that would be an interesting object of further research. Loyalty programs might play a crucial role for some passengers when choosing a service provider, thus exploring how incumbent managers could take advantage of a well-developed loyalty program should offer interesting input into the topic. Looking from an entrant point of view, an interesting approach would be to evaluate what effect does second attempt to enter the market has on low-cost carriers and whether or not when attempting a second time the entrant is more resilient to incumbent defence strategies. In the literature review, I presented various studies exploring exit barriers that an entrant has to consider when deciding to exit the market. Analysing exit barriers in the airline industry and how they affect entrant decision to leave compared to other price and product-related variables is another interesting approach to the topic.

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Appendix

Table 3 Descriptive Statistics of Airline Model

Variable	Observations	Mean	Std. Dev.	Min	Max
IncPriceChange	**11072**	-0.006	0.113	-1.341	0.538
IncPriceCut	**11072**			0.000	1.000
IncPriceChange × IncPriceCut	**11072**	2.637	2.626	0.000	6.299
ChPostEntryPrice	**11072**	4.924	0.358	3.610	6.292
ChPriceCut	**11072**			0.000	1.000
IncProductVariety(Frequency)	**11072**	0.004	0.255	-2.497	2.580
IncProductQuality(Arrive late)	**11072**	0.416	0.125	0.033	0.967
FuelPrice	**11072**	1.932	0.898	0.340	3.663
IncRouteImportance	**11072**	0.127	0.052	0.018	0.320
Leisure	**11072**			0.000	1.000
ChRouteImportance	**11072**	0.149	0.126	0.006	0.600
SecondEntry	**11072**			0.000	1.000
MarketDemand	**11072**	1.137	0.521	0.041	3.153

Table 4 Correlation Matrix of Airline Model

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**IncPriceChange**	1.00														
2	**IncPriceCut**	-0.12	1.00													
3	**ChPostEntryPrice**	0.81	-0.07	1.00												
4	**ChPriceCut**	-0.08	0.34	-0.14	1.00											
5	**IncProductVariety (Frequency)**	-0.01	-0.01	-0.02	-0.02	1.00										
6	**IncProductVariety (Peak)**	0.07	0.00	0.09	-0.01	0.00	1.00									
7	**IncProductQuality (Delay)**	-0.03	-0.01	-0.04	0.01	0.03	0.06	1.00								
8	**FuelPrice**	0.00	-0.10	0.14	-0.07	-0.03	0.05	-0.19	1.00							
9	**IncRouteImportance**	0.20	0.00	0.13	0.00	0.00	0.02	0.14	0.01	1.00						
10	**Leisure**	-0.01	-0.01	-0.13	0.03	-0.01	-0.08	0.00	-0.06	-0.28	1.00					
11	**ChRouteImportance**	0.03	-0.01	0.06	-0.01	-0.01	0.05	0.18	-0.19	0.17	-0.10	1.00				
12	**SecondEntry**	0.03	0.03	-0.01	0.03	-0.01	-0.02	-0.07	0.07	0.01	0.00	-0.06	1.00			
13	**MarketDemand**	-0.30	0.02	-0.36	0.00	0.03	-0.06	0.05	0.04	0.09	0.06	0.01	-0.02	1.00		
14	**MultiMarket Competition**	0.10	0.03	0.06	0.01	0.00	-0.01	0.15	-0.32	0.11	-0.10	0.74	-0.01	-0.12	1.00	
15	**CompetitiveIntesity**	-0.05	0.02	-0.19	0.06	0.01	-0.04	-0.06	0.06	-0.09	0.00	0.03	0.00	0.53	-0.19	1.00

Table 5 Multicollinearity diagnostics table for Airline Model

Variable	VIF	1/VIF
IncPriceChange	1.19	0.84
IncPriceCut	1.18	0.84
IncPriceChange × IncPriceCut	1.16	0.86
ChPostEntryPrice	1.16	0.86
ChPriceCut	1.15	0.87
IncProductVariety(Frequency)	1.14	0.87
IncProductQuality(Arrive late)	1.12	0.89
FuelPrice	1.09	0.91
IncRouteImportance	1.06	0.95
Leisure	1.02	0.98
ChRouteImportance	1.00	1.00
SecondEntry	1.19	0.84
MarketDemand	1.18	0.84
Mean	**VIF**	**1.12**

Table 6 Descriptive Statistics of Bus Model

Variable	Observations	Mean	Std. Dev.	Min	Max
IncPriceChange	**3,067**	3.79	0.56	2.53	5.02
IncPriceCut	**3,067**	0.50	0.50	0.00	1.00
IncPriceChange × IncPriceCut	**3,067**	0.00	0.37	-1.14	1.22
ChPostEntryPrice	**3,067**	2.95	0.64	0.00	4.83
ChPriceCut	**3,067**	0.61	0.49	0.00	1.00
IncProductVariety	**3,067**	0.00	0.33	-2.69	2.34
IncProductQuality	**3,067**	125.40	38.18	38.00	370.89

	Variable	1	2	3	4	5	6	7
1	IncPriceChange	1						
2	IncPriceCut	-0.07	1					
3	IncPriceChange × IncPriceCut	0.69	0.00	1				
4	ChPostEntryPrice	0.77	0.02	0.56	1.00			
5	ChPriceCut	0.03	0.06	0.00	-0.15	1		

6	IncProductVariety	-0.08	0.21	0.10	0.01	-0.03	1	
7	IncProductQuality	0.64	-0.02	0.38	0.62	-0.02	-0.11	1

Table 7 Correlation Matrix of Bus Model

Table 8 Multicollinearity diagnostics table for Bus Model

Variable	**VIF**	**1/VIF**
IncPriceChange	1.91	0.52
IncPriceCut	1.59	0.63
IncPriceChange × IncPriceCut	1.54	0.65
ChPostEntryPrice	1.09	0.92
ChPriceCut	1.06	0.94
IncProductVariety	1.05	0.96
IncProductQuality	1.91	0.52
IncPriceChange	1.59	0.63
Mean	**VIF**	**1.37**