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Switching Costs in the Brazilian Airline Sector: An Empirical Study

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Abstract

The paper measures switching costs in the context of the Brazilian airline sector during the period 2005-2017 by considering the indirect approach advanced by Shy (2002). The method allows an approximation only in terms of observable variables like price and market share. The evidence appears to indicate non-negligible switching costs but those display some decline over time, what is consistent with an increase in the competition in the sector as also had occurred in other countries.

Keywords: switching costs; airline industry.

1 Introduction

The emphasis of marketing policies on market share dominance is often justified. In fact, repeated purchases of captured consumers can indicate locking-in of agents and corroborate increased market power in some sectors. The costs for consumers changing their demands across distinct producers are denoted as switching costs and have been theoretically discussed by Klemperer (1987a, 1987b, 1995) and Shy (1996) among others. The referred costs appear to be prevalent in different real world situations as exemplified by the change of softwares, bank accounts, airlines and telephony operators. It is important to stress that switching costs can be artificial in some cases and constitute a deliberate strategy by the firm for creating dependency of repeated purchasers. In that sense, a salient example is provided by fidelity programs as given by frequent flyer programs in the case of airlines.

Attempts to measure such kind of costs are becoming more frequent and include Greenstein (1993) for mainframe computer purchases in terms of federal government procurement, Knittel (1997) for long-distance telephony, Maicas et al. (2009) for mobile telephony, Elzinga and Mills (1998) for wholesale distribution of cigarettes, Sharpe (1997), as well as Kim et al. (2003) for the banking sector, Chen and Hitt (2002) for on-line services providers (in terms of on-line brokerage industry) and yet Carlsson and Löfgren (2006) and Figer (2007) in the context of airlines.

In the present paper, we attempt to assess the magnitude of switching costs in the context of the main route in the Brazilian airline market, as given by the Rio de Janeiro/São Paulo air shuttle corresponding to Santos Dumond/Congonhas airports. In 2017, this was the fifth most frequent domestic flight route in the world. To analyze the switching costs between the companies operating in this route, we consider the approach suggested by Shy (2002), that legitimates an indirect measure of switching costs that depends only on prices and market shares.

The application to the Brazilian case is timely given important structural changes that took place over the years and that are likely to impact the competitive landscape of the industry. In particular, the liberalization of air fares following the creation of the specific regulatory agency and substantial growth of the demand that is yet constrained by supply

bottlenecks. Although one can observe quantitative investigations on the market power in Brazilian airlines as in Turolla et al. (2006), Lovadine (2009), as well as Nascimento et al. (2011), there is still a gap in terms of the measurement of the prevailing switching costs and assessment of its possible relevance for the competition in that market.

The paper is organized as follows. The second section discusses the basic conceptual aspects related to switching costs and mentions previous attempts of measuring it. The third section describes general features of the main route in Brazil (Rio de Janeiro/São Paulo air shuttle) and institutional and regulatory aspects of the Brazilian airline sector. The fourth section describes the data construction and undertakes the measurement of switching cost in the Brazilian airline sector. The fifth section brings some final comments.

2 Measurement of Switching Costs: A Brief Digression

The prevalence of switching costs can constitute an important source of market power and the central aspect to consider is that consumers that have previously purchased the good may be locked-in and have non-negligible costs to switch to other producer. Disutilities associated to switching decisions typically highlight unobservable effects associated with characteristics of the consumers. For example, a consumer who has used a particular software might be reluctant to invest in the acquisition of new skills and even artificial switching costs in terms of fidelity programs are difficult to assess given complex non-linear discounts and non-availability of the related consumer information.

The aforementioned empirical literature on the measurement of switching costs mostly has relied on direct methods that consider consumer's characteristics. An exception is provided by Carlsson and Löfgren (2006) that considered the indirect measurement approach advanced by Shy (2002) in the context of Swedish airlines. The underlying intuition of the referred approach involves the characterization of an equilibrium in prices where the switching cost appears as a relevant price component. It can be shown that even if a Nash equilibrium does not exist, it will still be possible to specify conditions for the prevalence of an undercut-proof property (UPP) that can be solved for the switching cost.¹

Consider a two-period setup in a market with two firms that respectively produce brands A and B . In the first period the consumers purchase the brands such that brand A attracts N_A consumers and the brand B attracts N_B consumers and let p_A and p_B denote the associated prices whereas S refers to the switching cost for changing brands.

Let n_A and n_B indicate the number of customers for the two brands in the second period. The distribution of customers across brands will be such that n_A will be given by:

$$0 \quad \text{if } p_A > p_B + S; \quad (1)$$

¹ For more on undercut-proof property, see Shy (2002).

$$N_A \quad \text{if } p_B - S \leq p_A \leq p_B + S;$$

$$N_A + N_B \quad \text{if } p_A < p_B - S.$$

and n_B will be given by:

$$0 \quad \text{if } p_B > p_A + S;$$

$$N_B \quad \text{if } p_A - S \leq p_B \leq p_A + S; \quad (2)$$

$$N_A + N_B \quad \text{if } p_B < p_A - S.$$

It is possible to ponder the existence of an equilibrium in prices satisfying the UPP condition. The undercut-proof property is satisfied if there exists a pair of prices so that no firm can increase its profit by undercutting the rival firm, and no firm can increase its price without being profitably undercut by the competing firm.

According to Shy (2002), in the case of $k \geq 2$ firms, each indexed by i , $i = 1, \dots, k$, considering the ordering of firms by market share, one has $N_1 > N_2 > \dots > N_k$. The firm's prices are denoted by p_i , $i = 1, \dots, k$. Under an equilibrium satisfying UPP the less profitable firm is the one with the smallest number of customers, which is motivated to undercut the others. In addition to that, the following behavior is assumed: the firm k fears that it is targeted by firm 1 and therefore defines its price, p_k , in relation to the price of that other firm, p_1 , so that firm 1 does not consider it profitable to undercut its price; each firm i , $i = 1 \dots k - 1$, fears to be undercut by firm k , and therefore defines its price, p_i , in relation to the price charged by firm k , p_k . Thus, the switching cost of firm k , denoted by S_k , is calculated according to the following expression:

$$S_k = p_k - \frac{N_1 p_1}{N_1 + N_k} \quad (3)$$

while the switching costs of the other firms, denoted by S_i , $i = 1 \dots k - 1$, are calculated according to the following expression:

$$S_i = p_i - \frac{N_k p_k}{N_i + N_k} \quad (4)$$

Therefore, it is possible to compute a measure of switching cost by relying on information on prices and market shares (in terms of the number of customers). Carlsson and Löfgren (2006) further advances by investigating the determinants of switching costs. For that purpose, explanatory variables indicating the availability of departures, dummy variables for the airport and number of competitors and yet the prevalence of a frequent flyer program (FFP) were considered. A salient result was the role of FFPs although no clear policy prescription emerges in that context.

3 Institutional and regulatory issues in Brazilian airline markets

3.1 Historical background

The Brazilian airline sector has experienced several significant changes that impacted in the competition between firms. Evangelho, Huse and Linhares (2005), Lovadine (2009), Oliveira (2007), Oliveira (2009), Turolla et al. (2006) highlight important historical events. Oliveira et al. (2016), as well as Barros, Gil-Alana and Wank (2016) describe the more recent events in that sector.

The previous decades, before the liberalization process, were characterized by a strong market control, with four national companies, operating in the main inter-regional connections and five regional companies responsible for intra-regional transport of the country. During that period, both prices and the frequency of flights were controlled by the authorities and the entry of new participants was prohibited.

A flexibilization process was coordinated by Civil Aviation Council (CONAC) and Civil Aviation Department (CAD), occurred in three rounds that took place in 1992, 1998 and 2001.

The first round of release extinguished the monopolies of regional airlines, except for so-called *special airlines* that made the connection between São Paulo, Rio de Janeiro, Belo Horizonte and Brasília. In addition, tariff bands introduced in the late 80s were changed, providing greater flexibility in the choice of firms by the consumers.

In the second round of liberalization, the removal of the measure of tariff bands and the monopoly of the special airlines, generated a period of strong competition, both in tariff prices as well as a race by gains in the frequency of flights. However, the process of competition between firms was strongly affected by the macroeconomic situation, especially by the strong devaluation of the real against the dollar in 1999, generating a cost shock for the sector and inhibited major strategic price cuts in tariffs.

In the third round, between 2001 and 2002, it was implemented the full flexibility of prices, input processes of firms, the number of flights and new aircraft, giving more

flexibility to adopt different competitive strategies by firms. However, in the last period, which began in 2003, largely as a response to the financial crisis faced by VARIG, emerged a stronger presence of the state in the industry, this time as a regulator, evaluating competitive practices and adopting measures for targeting market development.

Thus, the challenge was to accomplish the regulation of the airline industry and in 2005 the National Civil Aviation Agency (ANAC) was established, as well as complete price liberalization followed in 2006.² Despite this liberalization of the market, some points are impediments to greater competition, allowing a large market concentration as shown above, business practices by the incumbent and the limitation of foreign capital by 20% in the national airlines, hampered greater competition in the sector.

Under a potentially more competitive environment in the first decade of the 2000s one observed the entry of three firms in the domestic market. The first case was the entry of GOL Airlines in 2001, which adopted a business model low-cost low fare, unprecedented in the Brazilian market. In 2005, WEB-JET entered the market, however without the same success. Despite having adopted the same initial strategy of GOL, low-cost and low-fare, some differences made the WEB-JET entry of a lower market impact.

Another important event in the post-liberalization period occurred with a GOL aircraft accident in 2006 and later the accident with a TAM aircraft in 2007. During this period, known as *air blackout*, flight delays and cancellations more than doubled, failures were identified in the infrastructure of airports, the working conditions of flight operators and the problems related to the high concentration of flights at airports mentioned above.

As consequence of the deregulation of the industry, most companies adopted not only price strategies, but also reallocated their operations to the country's largest airports. Companies as VARIG, TAM and GOL, used Congonhas airport in their growth strategies. The GOL acquired VARIG in 2007 mainly to obtain slots at that airport. The entry of AZUL in the national market in 2008 was different from previous companies.

² The full liberalization took place under law 11.182 at 09/27/2005, see http://www.planalto.gov.br/ccivil_03/ato2004-2006/2005/lei/11182.htm.

This company has adopted a strategy in terms of the use of smaller aircraft and thereby reached smaller airports with direct flights. The participation of this company in air shuttle like Rio de Janeiro/São Paulo was very small.

The Brazilian airlines domestic market has also been characterized by bankruptcy, as well as mergers and acquisitions. In 2005, VARIG's judicial reorganization (receivership) was ordered. The following year NEW VARIG emerged, but its bankruptcy was decreed in 2010. VASP also had the judicial reorganization enacted in 2006 and was declared bankrupt in 2008. More recently, GOL acquired WEB-JET and AZUL merged with TRIP. The groups GOL, AZUL and LATAM Airlines (subsidiary of TAM) accounted 87.3% of the Brazilian domestic passenger market in 2017. Add the 11.7% share from AVIANCA and 99% of the market is controlled by just four companies.

The present study focuses its analysis on the Rio de Janeiro/São Paulo air shuttle, that is the main route for commercial civil aviation in Brazil, making the connection between the airports of Congonhas in São Paulo and Santos Dumont in Rio de Janeiro. In 2017, this was the fifth most frequent domestic flight route in the world, totaling 39,625 trips a year. These airports are still among the most punctual in the world, and about 80% of their flights were not delayed by at least 15 minutes (OAG, 2018).

In that year, the Rio de Janeiro/São Paulo air shuttle was disputed by only three companies, GOL, TAM and AVIANCA, which had respectively 41.3%, 40.9% and 17.8% of the market in terms of number of passengers. Even so, between 2003 and 2017, VARIG and VASP were able to reach considerable portions of this market before they are declared bankrupt. WEB-JET not reached 3% of that market share, and AZUL not reached even 0.5%. Both companies got only remaining slots wherefore operated few regular flights concentrated on weekends.³

National companies have their FFPs, factors that can contribute to the choice of consumer purchasing. TAM was the first Brazilian company to use the mileage program in 1993, the TAM Fidelidade, followed by VARIG in 1994. In 2007, GOL started its FFP with the

³ Companies like PANTANAL, TEAM appear only with occasional flights.

purchase of the VARIG's Smiles program and AVIANCA adopted the Amigo program. In 2009, AZUL introduced the TudoAzul program.

In the present study, the period between 2005 and 2017 is analyzed. The main historical events in Rio de Janeiro/São Paulo air shuttle occurred in this period are summarized in Table 1.

Table 1
Events in Rio de Janeiro/São Paulo Air Shuttle

Year	Event
2005	The Rio de Janeiro/São Paulo air shuttle is mainly dominated by GOL, TAM, VARIG.
2006	Full liberalization of prices is established. Bankruptcy of VARIG and return as NEW VARIG.
2008	Establishment of AVIANCA that already have occasional flights.
2009	Bankruptcy of VARIG. GOL adopt FFP.
2010	WEB-JET entry, but with flights mostly on weekends.
2012	Exit from WEB-JET. AZUL entry, but with flights mostly on weekends.
2016	Exit from AZUL.
2017	The market remains GOL, AVIANCA and TAM.

Source: Based in ANAC data.

3.2 Regulatory Aspects

The Competition in the airline industry can occur in different ways. Just as, in Brazil some companies are betting on a better quality of services other betting on lower rates, and it depends on the purpose (tourism or business) and its duration time. However, some specific aspects of this sector it apart and make it a sector of interest for the analysis of competition among companies. In fact, there are trade agreements, mergers and loyalty programs that can play a relevant role. A report prepared by the European Competition Authorities (ECA) highlighted three points in particular: frequent flyer programs (FFP), corporate discount schemes (CDS) and travel agent commissions (TAC).

In FFPs, passengers accumulate points that can be exchanged for new tickets or discounts and in some cases benefits as best attendance and travel class upgrade services with the repetition of the airline's choice. The CDS normally deal with bilateral agreements between firms offering special prices and discounts for companies with large travel volumes. Finally, the TAC refers to commissions paid by airlines companies to obtain information or to be specifically include a company flight ticket in packages offered by the tour agency.

Moreover, the report presents some cases where the authorities responsible for the maintenance of competition intervened against programs that generate greater switching costs for consumers. In the case of TACs, countries such as Italy, Ireland, Spain and England found that those programs were disrespecting the market regulation standards in their countries.

As for the CDS, their competitive effect can occur in terms of a greater bargaining power by the consumer, who may get lower prices associated with bulk purchases, but again the consumer may incur on switching costs. In some cases, the ECA report points out that markets in which the CDS occur can have higher average price to compensate for the specific discounts for particular company.

Finally, regarding the FFPs, only in Sweden and Norway there were interventions of the authorities against these programs. Their conclusion was that the mileage program has become a major barrier to new firm's entry and therefore should suffer intervention in favor of competition in the sector, with its partial or total ban. An important aspect raised by ECA refer to cases where who pays for the ticket is not accumulating the points, and for example, an employee of a company who flies to work might become less price sensitive. In addition, FFPs also become relevant with trade agreements and mergers, as well as can constitute an obstacle to the entry of new competitors.

Stragier (2002) points out the difficulty of entry of new firms related to trade agreements, access to slots and incumbent business practices that uses his position to keep its market share. The practices mentioned were loyalty programs, where the author points to the illegality observed in Virgin/BA programs and imposed fines to punish this kind of incentive. Moreover, FFPs and corporate discounts were also the focus of competitive

industry analysis. As a way to minimize the effect of the FFPs, the decisions related to these programs do not seek the cancellation or prohibition, but that entrant firms can participate in the programs established firms. Altogether, it is fair to say that the policy recommendations in the presence of switching costs are not yet completely clear cut.

At this point, we can identify the main points of economic theory that are related to business practices in this section: switching costs, barriers to entry and a principal-agent problem when the benefit does not apply to the person who paid for the ticket. In our article, we are especially interested in assessing the magnitude of switching cost and the factors that influence it. Thus, in the next section we will apply the methodology advanced by Shy (2002) to quantify this cost in the Brazilian civil aviation industry in the context of the Rio de Janeiro/São Paulo air shuttle.

4 Switching Costs: An Empirical Application

4.1 Data Sources

The data used in the preparation of this paper were obtained from the Brazilian regulatory agency ANAC on a monthly basis for the period 2005-1/2017-12. The database presents an unbalanced panel structure given the entry and exit of firms over the period.

The data of the companies GOL, AVIANCA, TAM and VARIG were analyzed, which together accounted for at least 98% of the market share at any time during the period considered. The entry of AZUL and WEB-JET was captured just by dummy variables, considering that these companies reached only remaining slots that allowed them to do few flights on the weekends.

In order to analyze the relevance and the switching cost behavior in the Brazilian airline sector, this unobservable variable, was constructed using the methodology developed in Shy (2002). Once those costs are measured, a reduced form econometric estimation is undertaken to assess the role of a group of explanatory variables.

In fact, this main route has short duration flights (roughly 45 minutes), punctuality and conditional the frequency of flights that may favor the customer convenience one can consider the service as essentially as homogenous in quality. The variables used in the analysis are as follows:

Switching costs (S): Those are constructed upon prices and market shares for the Rio de Janeiro/São Paulo air shuttle between the Santos Dumont (Rio de Janeiro) and the Congonhas (São Paulo) airports.⁴ One can observe different prices for a particular flight by an airline at a given period. Thus, we construct weighted averages for prices with

⁴ While the price data refers to the date of sale of the tickets, the passenger data paid refers to the date of the flight. As a result, when there were bankruptcies and acquisitions, remaining flights account for paid passenger data without a counterpoint in terms of ticketing price data. In these cases, the average price charged for tickets in the last three months was used as proxy. It seems reasonable to suppose that the remaining flight tickets were sold in that period.

weights given by the proportion of sold tickets that have a particular price.⁵ Those nominal figures (in R\$) are then deflated by a generic consumer price index [Índice de Preços ao Consumidor Amplo (IPCA)]. Thus, all tickets are expressed in 2017 prices. Market share, on the other hand, are obtained as the ratio of the number of paid passengers reported for each company relative to the total number of paid passengers in the period.⁶

Number of flights (NF): Number of flights of each firm on the Rio de Janeiro/São Paulo air shuttle.⁷

Number of flights of other companies (NF_C): Number of flights of the main competitors of the company concerned on the Rio de Janeiro/São Paulo air shuttle. **Lliberalisation (LIB):** Dummy variable reflecting full rate liberalization. This variable assumes value 1 from 10/2005 onwards and 0 before that month.

Weekend firms (WK): Dummy variable reflecting the operation of WEBJET and AZUL with flights on the weekends. These companies began to make flights because they got residual slots that were available on the weekends. This variable assumes value 1 from between 05/2010 and 11/2012, as well as between 02/2013 and 03/2013, and 0 in other periods considered.

Permanence of VARIG (P_{VARIG}): Dummy variable capturing the permanence of the firm in the Rio de Janeiro/São Paulo air shuttle. This variable assumes value 1 from between 01/2005 and 04/2006, as well as between 12/2006 and 12/2008, and 0 in other periods considered.

⁵ The price data were retrieved from: <https://sistemas.anac.gov.br/sas/downloads/view/frmDownload.aspx>.

⁶ Paid passenger data and number of flights were retrieved from: <http://www.anac.gov.br/assuntos/dados-e-estatisticas/dados-estatisticos/dados-estatisticos>.

⁷ At first one could conceive that a greater availability of flights in prime time and the number of flights in other routes. In fact, the former could provide a source of product differentiation whereas the latter could proxy a potential for accumulating miles with a frequent flyer program. However, those variables display very high correlations with the number of flights in general and thus were not included in the estimated model.

Permanence of AVIANCA ($P_{AVIANCA}$): Dummy variable capturing the entry and permanence of the in the Rio de Janeiro/São Paulo air shuttle. This variable assumes value 1 from 03/2008 onwards and 0 before that month.

GOL Frequent flyer program (FFP_{GOL}): Dummy variable capturing the GOL Smiles FFP. GOL was the only company that started a frequent flyer program during the period considered. The other companies already had programs before this period. This variable assumes value 1 from 03/2007 onwards and 0 before that month.

Table 2 provides summary descriptive statistics of the previously described variables.

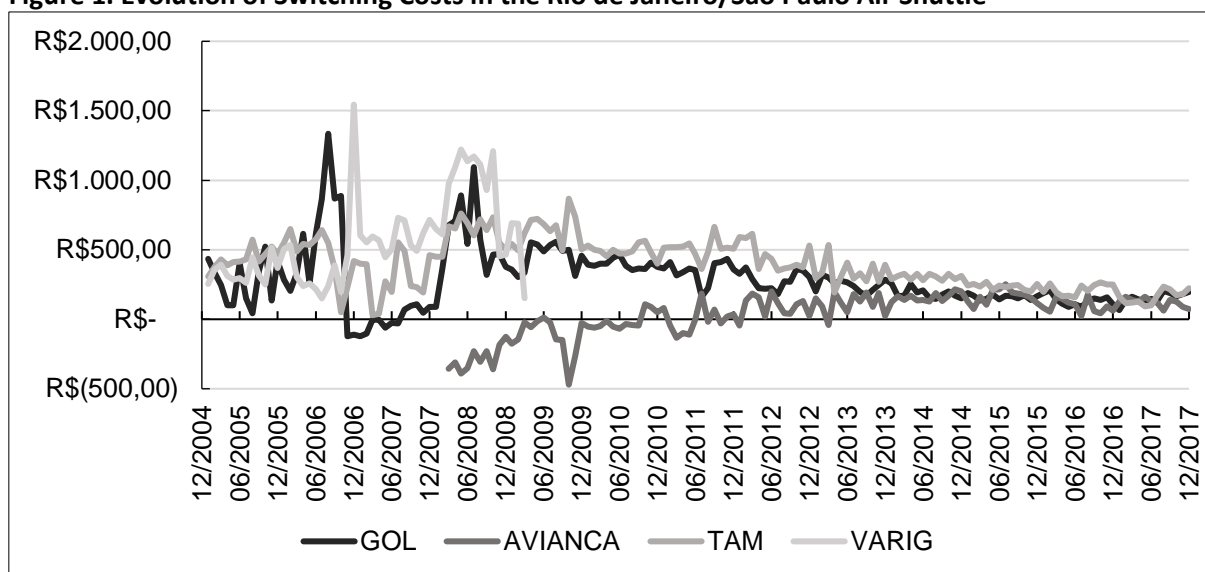
Table 2

Summary Statistics

Statistics	S	NF	NF_c
Mean	R\$ 289.61	1,094	2,282
Standard deviation	R\$ 261.78	417	463
Minimum	R\$ -470.44	8	1,270
Maximum	R\$ 1,544.50	1,687	3,618
Observations	481	481	481

Moreover, it is interesting to note the recently observed declining trend in the switching costs that might reflect a more competitive environment as indicated in Figure 1.

Figure 1. Evolution of Switching Costs in the Rio de Janeiro/São Paulo Air Shuttle



Source: Own elaboration.

Finally, it is worth mentioning that the magnitudes of the referred switching costs relative to the average flight rates are substantial in many cases as indicated in Table 3.

Table 3

Average Flight Rates and Switching Costs

Firm	\overline{NF}	\bar{S}
GOL	1,266	R\$ 283.37
AVIANCA	506	R\$ 37.32
TAM	1,412	R\$ 397.22
VARIG	957	R\$ 563.25

4.2 Empirical results

In this section we apply this methodology to data from this market, seeking to measure relations between the switching costs and some variables of interest. Before analyzing the data, some qualitative points must be made.

As we saw earlier, the stretch of the Rio de Janeiro/São Paulo air shuttle is the main route of the Brazilian commercial aviation and has specific characteristics that are important for the analysis. The first point is the fact that most of the flights on this route represent business travel and so the tickets are bought with little lead time, and thus less subject to discount prices.

Another feature is the short period of time, about 45 minutes to traverse the distance of 430 km. Thus, with some exceptions, it is expected that services differentials were less relevant in the consumer's decision compared to the longer duration flights.

However, other factors such as the airline's image in the sector, especially the dominant companies GOL and TAM, and FFPs and agreements (code-share) and alliances can contribute to the formation of switching costs for consumers.

To analyze the prevalence and magnitude of the switching costs in the Rio de Janeiro/São Paulo air shuttle, we will use the approach presented in Shy (2002) and then we will estimate a reduced form model presented below that is somewhat similar to the specification adopted by Carlsson and Löfgren (2006):

$$S = \beta_1 NF_i + \beta_2 NF_C + \beta_3 LIB + \beta_4 WK + \beta_5 P_{VARIG} + \beta_6 P_{AVIANCA} + \beta_7 FFP_{GOL} + \varepsilon, \quad (5)$$

where NF is the number of flights from a firm i , NF_C is the number of flights of competitors of the firm i , LIB is the dummy for full price liberalization, WK is the dummy for competition from other companies on weekends, P represents dummies for permanence of the firms, FFP_{GOL} is the dummy that capture the firm's frequent flyer program and ε stands for a stochastic disturbance.

Our database has an unbalanced panel structure in terms of different firms that operated the stretch over time. We have applied an ordinary least squares (OLS) model with the pooled data with unobserved heterogeneity being captured by some of the dummy variables that were previously mentioned. The results of this estimation are shown in the Table 4.

Table 4
Determinants of Switching Costs at the Rio de Janeiro/São Paulo Air Shuttle - Pooled Ordinary Least Squares (Unbalanced)

No. of observations: 481

Variable	Coefficient	p-value
NF	0.294	0.000
NF_C	-0.066	0.005
LIB	140.895	0.003
WK	1.414	0.974
P_{VARIG}	152.653	0.097
$P_{AVIANCA}$	165.411	0.188
FFP_{GOL}	-236.776	0.000

Note: Adjusted $R^2 = 0.440$ and p-values are based on White period robust estimator for standard errors with degrees of freedom correction.

The statistical results seem satisfactory with mostly significant coefficients. In particular, the coefficients of NF and NF_C are both significant and respectively display positive and negative signs. Those results are expected and are analogous as those obtained by Carlsson and Löfgren (2006) for the Swedish case.

Additionally, the reduced-form model considers distinct control explanatory variables that aim to portray the particular regulatory and competitive dynamic in the Brazilian case for that main route. Within the sample period of our study only one new FFP was established by GOL and it seems to exert a negative effect on the switching costs. In contrast, residual presence of other companies does not have a significant effect on switching costs. A distinctive feature of the Rio de Janeiro/São Paulo air shuttle refers to the flow of executives who travel for work during the week, the re-allocation of the remaining slots on weekends by ANAC did not have a significant effect on the switching costs. Likewise, variables indicating the permanence of VARIG in the market or actual entry of AVIANCA do not have a significant effect. Finally, the price liberalization variable (LIB) has a significant effect on switching costs.

The behavior of the switching costs of AVIANCA, which start with negative values and become increasingly positive, is a possible determinant of the positive sign in the parameter of LIB found in the estimation. That firm remained in the N_k position since its entry into the market. However, after the full liberalization all the switching costs seem to converge to a positive point, which is greater than the AVIANCA's initial switching costs and lower than the average of switching costs of GOL and of TAM. This is the price equilibrium dynamic expected for the policy.

Thus, the case for the existence and relevance of switching costs appears as compelling in that market. Therefore, future econometric studies that aim at assessing the competitive behavior in this market may benefit if take into account the presence of this type of cost.

5 Final Comments

The paper aimed at identifying the presence and relevance of switching costs in the Brazilian airline industry. For that purpose, we made use of the methodology developed in Shy (2002) that advances a simple approach that relies only on price data and market share of competing firms.

The main results indicate that the switching costs of the different companies are non-negligible and in general displayed a convergence towards a smaller level over time. The evidence is suggestive as the sector was especially dynamic in Brazil as experienced liberalization, entry of new competitors and the creation of a new FFP and overall different aspects of competitive pressure appear to have had relevant effects. The effects of NF and NF_C are qualitatively analogous to those obtained in the previous study for the Swedish market whereas particularities of FFPs and regulatory landscape of the Brazilian case appear to play some relevant role.

Avenues for future investigation may include studies that incorporate the switching costs indicator as part of a more direct assessment of the competition in that market. For example, Klemperer (1989) relates the entry of new firms to a period of price war in markets with switching costs but related empirical investigations are still absent.

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