

## **V Semana da qualidade da informação do transporte aéreo**

# **Estudo dos efeitos da padronização de frota nos custos e lucratividade de empresas aéreas no Brasil**

Rodolfo R. Narcizo  
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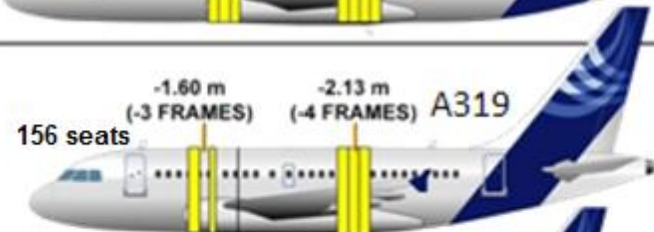
# Introdução

*“the 737 Max, guarantees to Southwest Airlines a single-fleet [...] with all of the operational benefits associated with training, and schedule recovery and our maintenance programmes”*

**Southwest**  **Mike Van De Ven**  
Chief operating officer

(Flightglobal, 2011)

# Introdução



# Introdução

## Composição de Frota

## Fabricantes, Famílias e Modelos



28 B737; 92 B738

Fabricantes 1  
Famílias 1  
Modelos 2



10 A318; 4 A319; 31 A320;  
2 A330

Fabricantes 1  
Famílias 2  
Modelos 4



21 A319; 65 A320; 31 A321;  
6 A350; 14 B767; 10 B777

Fabricantes 2  
Famílias 4  
Modelos 6



5 A320; 5 A330; 39 ATR72;  
10 E190; 64 E195

Fabricantes 3  
Famílias 4  
Modelos 5

# Objetivo

- Identificar os efeitos da padronização de frota
  - Custo operacional
  - Margem de lucro operacional



# Revisão de literatura

## Padronização de frota

- ✓ **Reduz custos e aumenta o desempenho operacional**  
(Seristö e Vepsäläinen, 1997; Kilpi, 2007; West e Bradley, 2008; Brüggén e Klose, 2010; Merkert e Hensher, 2011; Zou, Yu e Dresner, 2015)
- ✓ **Não tem efeito sobre custos**  
(Zuidberg, 2014)
- ✓ **Capacidade de reduzir a receita e a margem de lucro**  
(Zou, Yu e Dresner, 2015)

# Revisão de literatura

## Tamanho de frota

- ✓ **Há economia de densidade e intensifica o efeito da padronização**  
(Brüggen e Klose, 2010)
- ✓ **Não tem efeito sobre custos ou margem de lucro**  
(Zou, Yu e Dresner, 2015)

## Idade de frota

- ✓ **Correlação negativa entre idade de frota e custo operacional**  
(Zuidberg, 2014; Zou, Yu e Dresner, 2015)

# Revisão de literatura

## Tamanho de aeronave

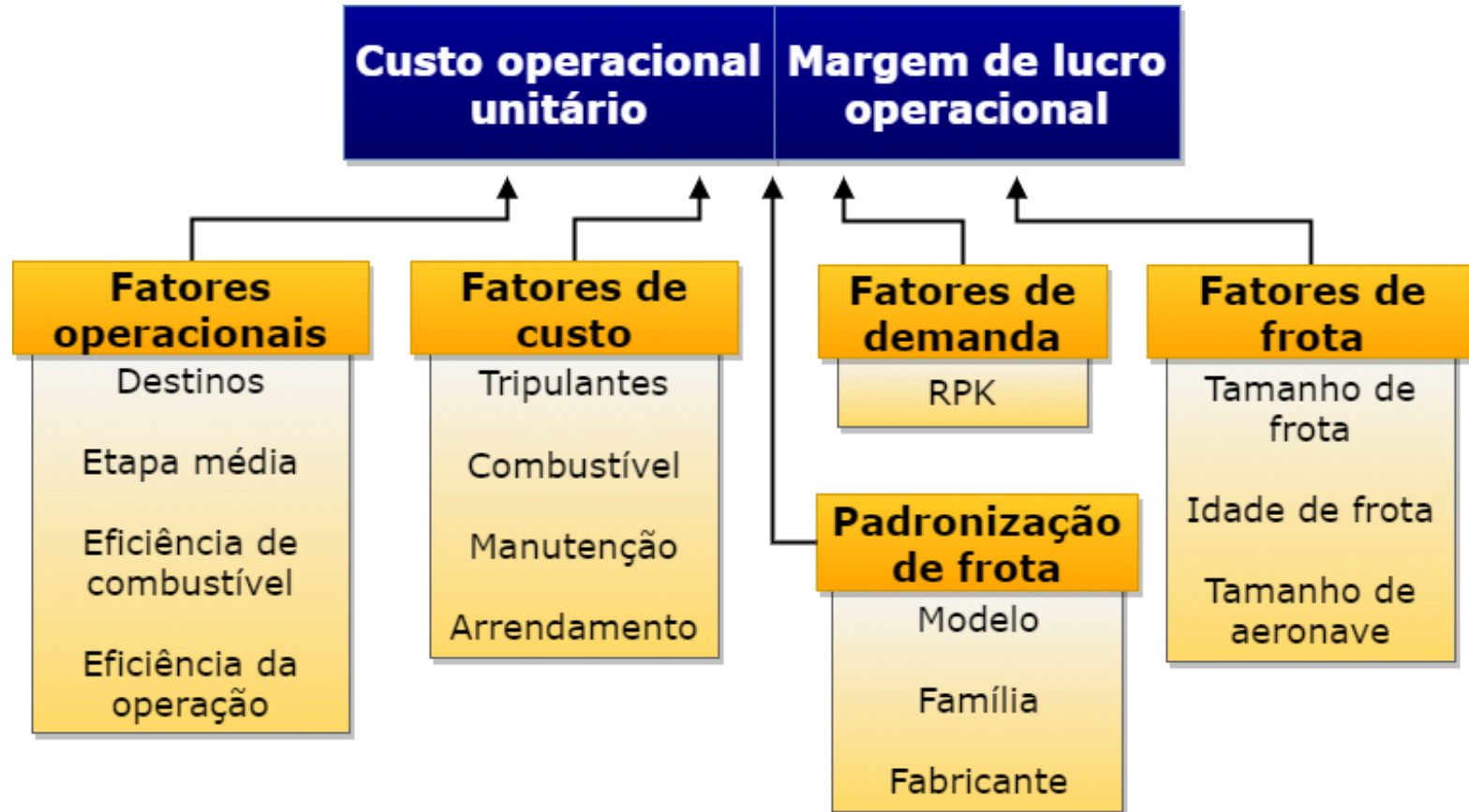
- ✓ **Correlação negativa entre tamanho de aeronave e custos**  
(Merkert e Hensher, 2011; Zuidberg, 2014)

## Etapa média de voo

- ✓ **Correlação positiva com desempenho operacional**  
(Brüggen e Klose, 2010; Windle, 1991)
- ✓ **Não tem efeito na eficiência e nem nos custos**  
(Merkert e Hensher, 2011; Zuidberg, 2014)



# Modelo conceitual



# Modelo econométrico

$$Y = \beta_0$$

**Custos**

$$+ \beta_1 \ln \text{labor cost}_{kt} + \beta_2 \ln \text{fuel cost}_{kt}$$

$$+ \beta_3 \ln \text{maintenance cost}_{kt} + \beta_4 \ln \text{leasing cost}_{kt}$$

**Demanda**

$$+ \beta_5 \ln \text{rpk}_{kt}$$

**Operacionais**

$$+ \beta_6 \ln \text{destinations}_{kt} + \beta_7 \ln \text{average stage length}_{kt}$$

$$+ \beta_8 \ln \text{fuel efficiency}_{kt} + \beta_9 \ln \text{operational efficiency}_{kt}$$

**Frota**

$$+ \beta_{10} \ln \text{fleet size}_{kt} + \beta_{11} \ln \text{fleet age}_{kt} + \beta_{12} \ln \text{aircraft size}_{kt}$$

$$+ \beta_{13} \text{standardization: model}_{kt} + \beta_{14} \text{standardization: family}_{kt}$$

**Padronização**

$$+ \beta_{15} \text{standardization: manufac}_{kt} + \beta_{16} \text{standardization: family} \times \text{LCC1}_{kt}$$

$$+ \beta_{17} \text{standardization: family} \times \text{LCC2}_{kt}$$

$$+ \gamma_{\text{airline}} + \gamma_{\text{year}} + \epsilon_{kt}$$

# Resultados

	ln cask	op margin	ln crpk
ln labor cost	0.2737***	-0.1034***	0.2794***
ln fuel cost	0.3821***	-0.0941**	0.3976***
ln maintenance cost	0.1028***	-0.0423**	0.0963***
ln leasing cost	0.0810***	-0.0193	0.0750***
ln rpk	0.0774	0.4713***	-0.7725***
ln destinations	-0.0484	-0.0493	0.1484
ln average stage length	-0.3201**	-0.1576	-0.0384
ln fuel efficiency	-0.4171***	0.0838	-0.2392**
ln operational efficiency	-0.0788	-0.3989*	0.6185***
ln fleet size	-0.1496	-0.4146**	0.5830***
ln fleet age	0.0846**	-0.0554	0.0186
ln aircraft size	-0.5019***	0.3285	0.2754
standardization: model	-0.0641	0.1267	-0.0735
standardization: family	-0.1710***	0.2722**	-0.2065***
standardization: manufacturer	0.1245	-0.1918	0.1361
standardization: family × LCC 1	0.1114	-0.1805	0.1447
standardization: family × LCC 2	-0.0210	-0.0619	-0.0093
Adjusted R-squared	0.9827	0.9317	0.9840
RMSE	0.0471	0.0774	0.0530
Number of observations	384	384	388

P-valor: \*\*\*p<0.01, \*\*p<0.05, \*p<0.10

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# Considerações finais

- O estudo investiga a consequência
- Investigar a causa da padronização de frota





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