

Appendix

A – Market and Industry Characterization

Table A.1. – Top 10 Advertising Investors in Portugal in 2013

Top 10 Companies	Sector	Share
Continente	Retail	5,8%
Fixeads	Retail	4,4%
L’Oreal	Cons Staples	3,4%
PT	Telecom	2,8%
Unilever	Cons Staples	2,7%
Vodafone	Telecom	2,7%
Puig	Cons Staples	2,5%
P&G	Cons Staples	2,5%
C ^a Port. De Hiper.	Retail	2,1%
Worten (Sonae SR)	Specialized Retail	2,0%
Total		30,9%

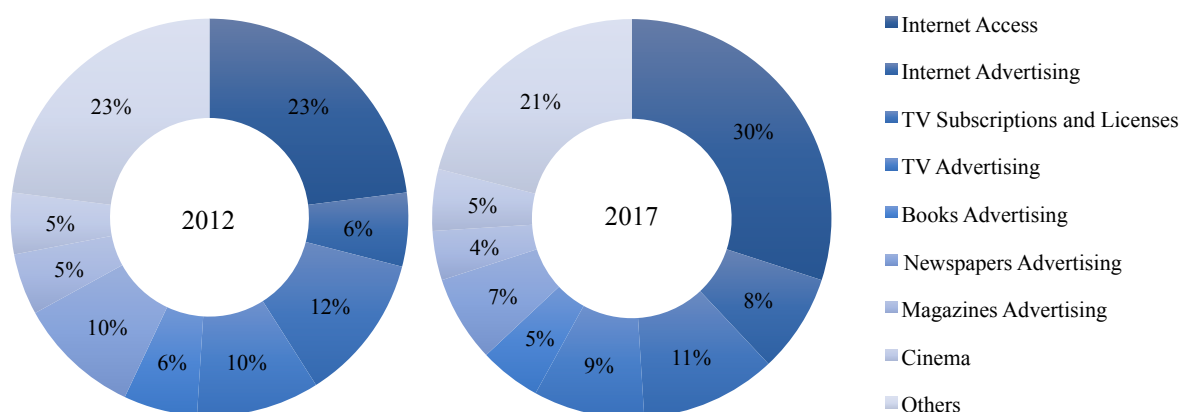
Source: Media Monitor (BPI Equity Research)

Table A.2. – List of Pay-TV channels per group considered (2012 - 2016)

Group	Pay-TV Channels
FNG	24 Kitchen, Fox, Fox Life, Fox Crime, Fox Movies Portugal, FX, Nat Geo Wild, National Geographic, Fox Comedy
Dreamia	Hollywood, Panda, BIGGS, MOV
Impresa	SIC Noticias, SIC Mulher, SIC Radical, SIC K, SIC Caras
Media Capital	TVI24, TVI Secret Story, TVI Ficção, +TVI, TVI Big Brother VIP, TVI Reality
Disney	Disney Channel, Disney Cinemagic, ESPN Classic, ESPN America, Disney Junior
Sony	AXN, AXN Black, AXN White
Discovery	Discovery, Discovery Turbo, Discovery Science, Discovery Civilization, TLC, DISCOVERY HD SHOWCASE, Discovery World Portugal
RTP	RTP3, RTP Memória, RTP Africa, RTP Olímpicos HD, RTP Madeira, RTP Açores
AMC	bio., MGM, A&E, AMC, Historia, Odisseia
Sport TV	SportTV, SportTV2, SportTV3, SportTV Golfe, Sport TV Liga Inglesa HD, SportTV4, SportTV Live, SportTV5

Source: MMW/Media Monitor

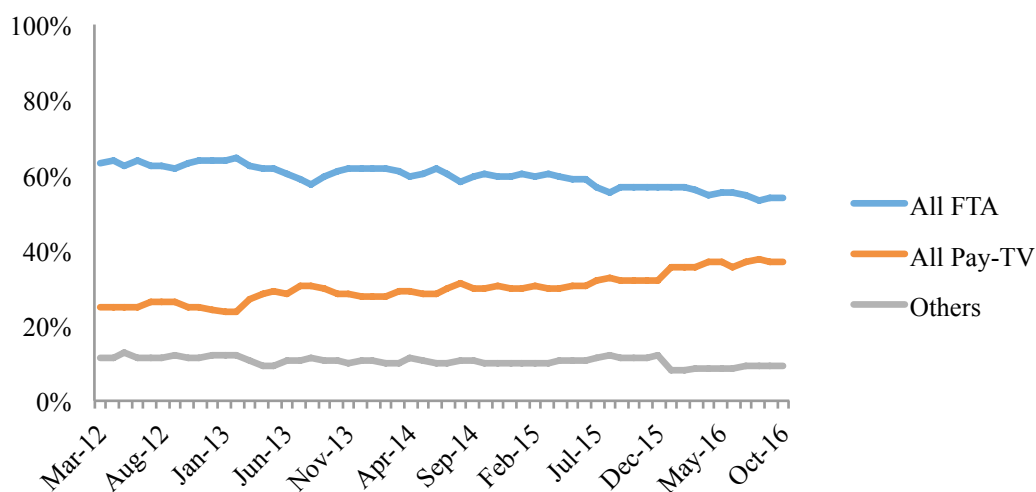
Figure A.1. – Global Market Share of the main media segments, 2012 and 2017



Source: PwC

According to PwC (2013), Internet Access will reach in 2017 30% of media industry worldwide, whereas TV Subscriptions and Licenses are expected to achieve only 11%. Moreover, TV Advertising will decrease to 9% of the industry, against 8% for Internet Advertising. Even though the forecasted CAGR was 5% in TV Advertising and 4% in TV Subscriptions and Licenses from 2012 to 2017, digital mediums are expected to grow even more.

Figure A.2. – Market Share by type of channel, Mar12 - Oct16



Source: MMW/Media Monitor

B – Regression Analysis

Table B.1. – Summary Statistics

Sample

Variable	Unit	Mean	SD	Min	Max
SOI	%	0,45	0,93	0	4,65
SOA	%	0,21	0,20	0	0,83
Marketing Expenses	%	1,75	7,97	0	59,54
Rebranding	0/1	0,19	0,40	0	1
25-34 years old	%	0,31	0,39	0	1,54
65+ years old	%	0,06	0,05	0	0,21
High Status	%	0,76	0,78	0	2,75
Low Status	%	0,11	0,12	0	0,55
Adult Animation	%	21,94	35,37	0	100,00

Number of observations: 57

Sub-sample: before rebranding

Variable	Unit	Mean	SD	Min	Max
SOI	%	0,09	0,16	0	0,86
SOA	%	0,12	0,07	0	0,25
Marketing Expenses	%	0,03	0,17	0	1,16
Rebranding	0/1	0	0	0	0
25-34 years old	%	0,14	0,09	0	0,36
65+ years old	%	0,05	0,05	0	0,21
High Status	%	0,41	0,29	0	1,27
Low Status	%	0,06	0,04	0	0,15
Adult Animation	%	19,40	33,83	0	100,00

Number of observations: 46

Sub-sample: after rebranding

Variable	Unit	Mean	SD	Min	Max
SOI	%	1,96	1,30	0,71	4,65
SOA	%	0,59	0,13	0,43	0,83
Marketing Expenses	%	8,99	16,87	1,59	59,54
Rebranding	0/1	1	0	1	1
25-34 years old	%	1,00	0,41	0,52	1,54
65+ years old	%	0,08	0,04	0,03	0,19
High Status	%	2,19	0,50	1,08	2,75
Low Status	%	0,32	0,10	0,18	0,55
Adult Animation	%	32,55	41,26	0	100,00

Number of observations: 11

Table B.2. – Variables Description

Variable	Description
25-34 years old	% of Fox Comedy's young adult viewers, compared to the total viewers from this category in all market
65+ years old	% of Fox Comedy's senior viewers, compared to the total viewers from this category in all market
High Status	% of Fox Comedy's viewers with the highest educational levels and professional occupations, compared to the total viewers from this category in all market
Low Status	% of Fox Comedy's viewers with the lowest educational levels and professional occupations, compared to the total viewers from this category in all market
Adult Animation	% of Fox Comedy's purchased hours used on mainstream animation geared towards adults (e.g., The Simpsons, Family Guy, etc.), compared to the Fox Comedy's purchased hours used on all types of programming
Marketing Expenses	% of Fox Comedy's marketing expenses in one month, compared to the total Fox Comedy's marketing expenses within the studied period

Table B.3. – 2SLS (first stage), Weak Instrument Test and Hausmann Test

Variable	Coefficient
SOI	0,02033*
25-34 years old	0,25709*
65+ years old	0,66957*
High Status	0,10578*
Low Status	-0,21359***
Adult Animation	0,00016
Rebranding	0,00054***
Weak Instrument Test (F statistic and p-value)	421,33 p = 1,7185 ⁻⁴¹ *
Hausmann Test (F statistic and p-value)	-0,90 p = 0,3716

* $p < 1\%$

** $p < 5\%$

*** $p < 10\%$

Adjusted R²: 98,13%

The “instruments” are strongly correlated with the endogenous variable, as it is advisable. The weak instrument test also provides evidence on that.

Table B.4. – OLS and 2SLS (second stage)

Variable	OLS Coefficient		2SLS Coefficient	
SOA	2,07513***	1,45331***	2,51901***	1,64659***
Marketing Expenses	0,03389*	0,03372*	0,03443*	0,03398*
Rebranding	0,00532	0,00880***	0,00410	0,00787***
Year Fixed Effects	✓		✓	

* $p < 1\%$

** $p < 5\%$

*** $p < 10\%$

Adjusted R² (OLS): 67,81%

Adjusted R² (2SLS): 68,33%

Adjusted R² (OLS without year fixed effects): 69,30%

Adjusted R^2 (2SLS without year fixed effects): 69,56%

Note that not controlling for time trends in a panel data can bias the estimate. For that reason we will focus the analysis on the columns where we incorporated year fixed effects.

C – Forecasting Model

Table C.1. – Stationarity test (ADF) for the original series

Test version	t-statistics	C.V.	p-value	Significance level	Stationary?
No Constant	2,8	-2,0	99,8%	5%	No
Constant-Only	2,1	-3,1	99,9%		No
Constant+Trend	0,5	-1,6	70,8%		No
Const.+Trend+Trend ²	-1,4	-1,6	8,6%		No

We consider the stochastic process of form:

$$y_t = \varphi y_{t-1} + \varepsilon_t$$

where $|\varphi| \leq 1$ and ε_t is white noise. If $|\varphi| = 1$, we have what is called a unit root. In particular, if $\varphi = 1$, we have a random walk (without drift), which is not stationary. In fact, if $|\varphi| = 1$, the process is not stationary, while if $|\varphi| < 1$, the process is stationary.

Accordingly, the hypothesis we are testing are:

$$H_0: \varphi = 1$$

$$H_1: \varphi < 1$$

The max lag order was chosen based on the Schwert criteria equation:

$$l_{max} = \left\lceil 12 \cdot \left(\frac{M}{100} \right)^{\frac{1}{4}} \right\rceil$$

where M is the number of observations in the time series.

With $M = 58$, the l_{max} is 10 (rounded).

Table C.2. – Addressed Methods and respective MSE and MAD values

Method	MSE	MAD
Double Moving Average	0,000066	0,0041
Double Exponential Smoothing (Holt's Method)	0,000040	0,0028
Holt-Winter's Method for Additive Seasonal Effects	0,000049	0,0032
Quadratic Trend Model with Multiplicative Seasonal Indices	0,000050	0,0042
Random Walk Model	0,000082	0,0039

Table C.3. – Stationarity test (ADF) for the random walk model (first difference)

Test version	t-statistics	C.V.	p-value	Significance level	Stationary?
No Constant	-2,7	-2,0	0,9%	5%	Yes
Constant-Only	-5,0	-3,1	0,1%		Yes
Constant+Trend	-5,9	-1,6	0,0%		Yes
Const.+Trend+Trend ²	-6,3	-1,6	0,0%		Yes

$l_{max} = 10$

Table C.4. – Monthly forecasted values (Holt's method), Nov16 - Oct17

November 2016	3,30%
December 2016	3,61%
January 2017	3,93%
February 2017	4,24%
March 2017	4,56%
April 2017	4,88%
May 2017	5,19%
June 2017	5,51%
July 2017	5,82%
August 2017	6,14%
September 2017	6,45%
October 2017	6,77%

Figure C.1. – Original Observations and Forecast, Quadratic Trend Model with Multiplicative Seasonal Indices

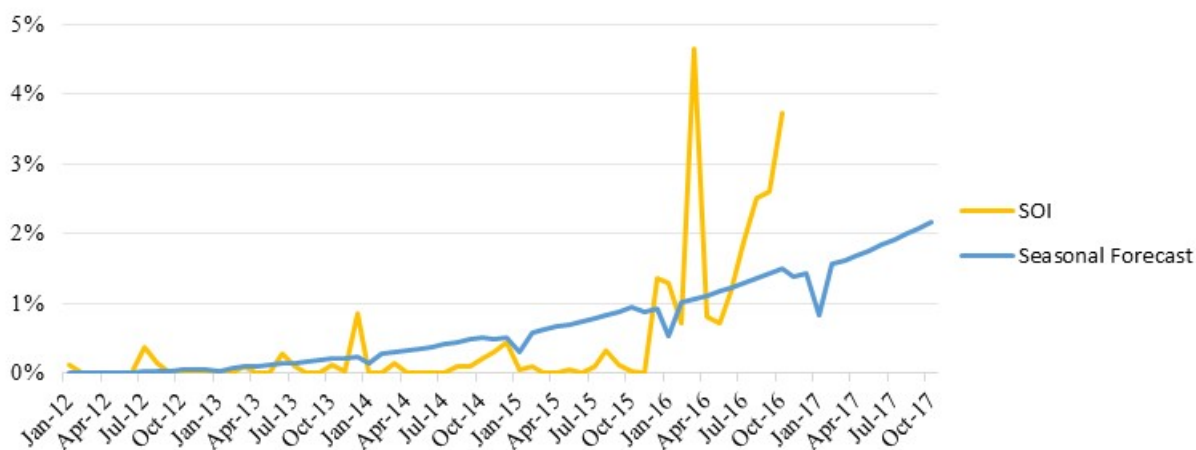


Figure C.2. – First Difference Series, Random Walk Model

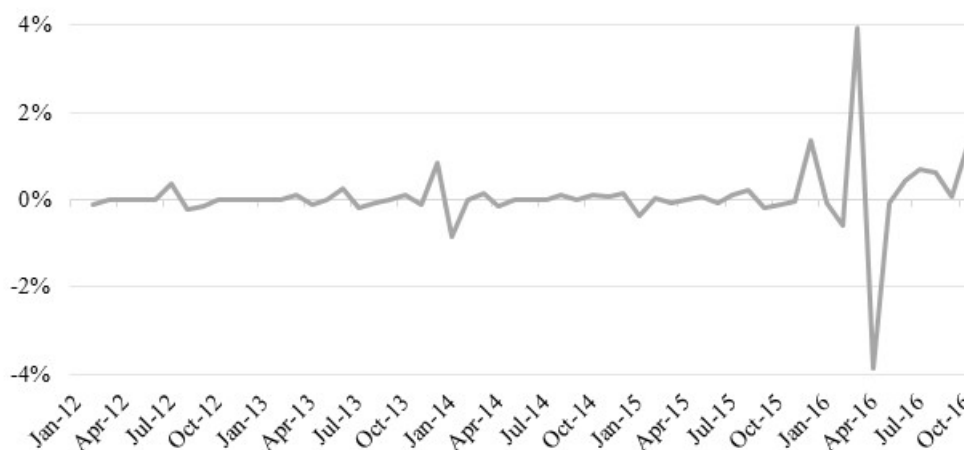


Figure C.3. – Original Observations and Forecast, Random Walk Model

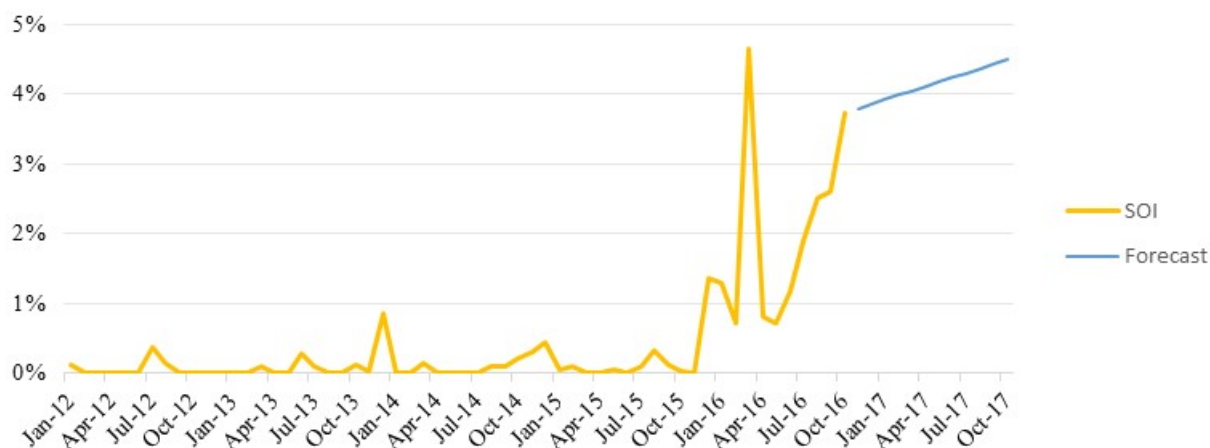


Figure C.4. – Original Observations and Forecast, Holt-Winter’s Method for Additive Seasonal Effects

