A panel cointegration approach to the relationship between economic growth and advertising expenditures

by

Carlos Sáez

A thesis submitted in conformity with the requirements
for the MSc in Economics, Finance and Computer Science.

University of Huelva & International University of Andalusia

November 2016

A panel cointegration approach to the relationship between economic growth and advertising expenditures

Carlos Sáez

Máster en Economía, Finanzas y Computación

Supervisor: Mónica Carmona

Universidad de Huelva y Universidad Internacional de Andalucía

2016

Abstract. This piece of research revisits the relationships between economic growth and advertising expenditures for different media in the EU-15, from 2002 to 2012 using stationary and cointegration analysis. First, data series properties were checked to determine their stationarity using a battery of panel unit root test for which resulted that the series are integrated of order one. Once the hypothesis of unit root is accepted the long run relationship between advertising expenditures and GDP is explored by applying the Pedroni's panel cointegration tests. Results indicate that there is a relationship between both variables for aggregate data and also for advertising expenditure in different media, except for newspapers.

Keywords: advertising expenditures, panel cointegration, economic growth, media.

Resumen. Estudio de la relación entre el desarrollo económico y el gasto en publicidad para diferentes medios en 15 países de Europa occidental, entre los años 2002 y 2012 usando técnicas para análisis de la estacionalidad y cointegración. En primer lugar, se ha determinado las propiedades de los datos mediante los precisos test de raíz unitaria para datos de panel dando como resultado integración de orden uno. Una vez que se confirma la estacionalidad de los datos, se ha explorado la relación del gasto en publicidad con el PIB a través de los tests de cointegración de Pedroni. Los resultados indican que existe una relación entre ambas variables para los datos agregados y también para los diferentes medios, excepto para la prensa escrita.

Table of Contents

List of Tables

1 INTRODUCTION

The focus of this work is to provide new empirical findings about the relationship between advertising expenditures and GDP, exploring the existence of asymmetries in the relationship not only by countries, but also by media. As previous literature states one could argue that economic growth and advertising expenditures evolve in the same direction. In certain extent this comovement should be expected since advertising expenditures must be highly and positively correlated with the aggregate demand. In other words, positive (negative) shocks in the aggregate demand lead positive (negative) variations in GDP and then on advertising spending. This relationship has been explored in previous empirical literature, which provides findings about the existence of this relationship. (see van der Wurff, Bakker and Picard for a survey). These studies point to that the impact of economic development on Ad spending is different across countries, type of media and period. One could hypothesise that the ignorance of potential sources of asymmetries, such as unobserved heterogeneity or differences by media could be behind, the lack of robustness of these previous results.

On these bases this work treats to extend previous empirical studies by considering these two potential sources of bias, by using a pooled data of 15 EU countries, during the last decade In sum the objective is to check if the advertising spending intensity of growth could vary by country, depending on the level of economic development, and by media.

To carry out this task, we make an econometric exercise into two steps. First we analyse the existence of unit roots in the time series, by using a battery of panel roots test in order to test the robustness of our results. Once this hypothesis is confirmed, we run a panel cointegration analysis, for testing our hypothesis. Our results confirm previous ones in the sense that aggregate advertising intensity is higher where per capita GDP is higher. However, when we explore the relationship by media, the picture is more complex and with some controversial results with regard previous findings. Thus, the responsiveness of advertising expenditure in newspapers is not statistically significant to changes in GDP. By contrast Internet and TV show a higher advertising intensity than the other medium

(outdoor or radio). Finally Magazine and Cinema are showing a decreasing evolution in such way that newspapers, magazine and cinema are losing relative weight in the aggregate advertising expenditure as the economy is richer.

Results are interesting not only for a better knowledge about the effect of advertising in different media as a leading indicator of economic performance, but also for forecasters.

The paper content is the following: the second section is presenting a selective review of previous literature on the relationship between economic growth and advertising expenditures from an aggregate perspective. The third section contains the empirical framework. Finally, the fourth is devoted to the discussion of empirical findings and the last part concludes.

2 LITERATURE REVIEW

One of the most solid explanations of the impact of economic growth on advertising expenditures is that many firms follow different criteria when setting its advertising budget expenditure such as "what we can afford" or "percentage of actual or expected sales", practices that influence in a considerable extent the relationship between the economic status and advertising expenditures (van der Wurff, Bakker, and Picard 2008).

Further research suggests that in times of economic adversity, many firms cut back on advertising expenditures as managers may find it difficult to justify large advertising investments during harsh economic times. And the reverse situation holds in economics expansions (Deleersnyder, 2009).

At first, it might be argued that advertising expenditures are elastic because advertising is one of the first things that "companies decide to cut when faced with slowing sales." (Economist 2008) resulting that advertising closely follows the economic cycle, however there are indications that inelastic advertising is associated with superior firm performance (Frankenberger and Graham 2003; Srinivasan, Rangaswamy, and Lilien 2005).

When advertising is treated as an expense, it is intended to generate returns in the short run. For managerial cultures with long-term orientation, advertising is a key instrument to build

brand image in the markets rather than generating short-term profitability, thus managers in these cultures should be less inclined to let advertising decisions be dictated by fluctuations in the economic environment. We expect less cyclical dependence when advertising is viewed as investment than when it is viewed as an expense (Deleersnyder 2009).

Firm's advertising decisions remain subject to social influences as managers often mimic the opinions and behaviour of others. Speculation may cause herding behaviour in societies with high risk avoidance (Hofstede 2001), inducing managers to decrease advertising during tough economic times and to expand advertising when most other firms do instead of conducting a formal and independent analysis of the situation, which exacerbates cyclical swings in advertising during up- and downturns (Steenkamp al. 2005).

In a country, part of the total advertising is done by foreign firms, which are less influenced by local economic conditions. Thus, advertising's cyclical dependence may differ when more foreign-owned multinationals are present (Deleersnyder 2009).

The structure and composition of the economy is an important factor in determining patterns in advertising expenditures as some industries and economic sectors use advertising more intensely than others. Advertising expenditures are relatively low in developing countries because these countries' economies depend to a large extent of the production and exportation of primary products. Moreover, there are variations concerning the distribution of advertising expenditures across different media and the reasons for these variations are in themselves varied, including between these legislation, marketing traditions or simple habits differences (van der Wurff, Bakker, and Picard 2008).

Regarding the relationship between GDP and advertising expenditures, they are likely to be strongly related during recession in some countries in certain conditions but not in all cases (Shaver and Shaver, 2005).

In addition, we have learnt from past findings that print media (newspaper and magazine) advertising expenditures are most affected by recessions than electronic media (television and radio). As retailers tend to cut their expenditures in slowdowns and they are prime

advertisers for newspapers and radio, it is an evident reason of why these media fall so dramatically while television expenditures are apparently less affected (Picard 2001).

Electronic media (radio and television) advertising expenditures are relatively immune to economic change and advertising expenditures in these media tend to grow regardless of whether the economy is growing or contracting (Richard van der Wurff and Piet Bakker, and Picard 2008)

To conclude, it has been found that media are not substitutes on the shorter term (Huysmans, De Haan, and Van den Broek 2004).

Title	Author	Data	Hypotheses and methodology	Empirical findings
"Effects of recessions on advertising expenditures"	Picard (2001)	1989-1998 Nations with evidence of economic downturn during the specified period. Germany, France, Italy, Japan, United Kingdom, United States, Finland, Sweden and Spain	1) How are advertising expenditures related to recessions? 2) Which media suffer most from lower advertising expenditures during a recession? Correlation method used.	The answer to both questions are affirmative. Significant declines in advertising spending were found during the recessions studied and print media were more affected than electronic media in those recessions. There are different factors for every region that might change advertiser response to media expenditure in recessions
"Relative constancy of advertising spending"	2005. Chang and Chan-Olmsted	Advertising expenditure data from a total of 81 countries, from 1991 through 2001. Total advertising expenditure for the countries and in 6 different media: television, radio, newspaper, magazine, cinema and outdoor.	RQ1: Relationship between national economy, as reflected by GDP, and advertising expenditures across countries. RQ2: Is there a relative constancy of advertising spending over time across different nations? What factors affect the differences? 1) Static analysis using cross-sectional data with simple and multiple regression models 2) Dynamic analysis using time-series data for 70 countries between 1991	The proportion of total advertising spending in the total economy (GDP) is not constant among nations. The intensity and constancy of this relationship are a complex phenomenon moderated by other national factors and further complicated by the variation between different media The PRC notion might still be applicable in similar clusters of nations and/or with regard to similar types of mass media, for example it seems to be more

			and 2001. 3-step procedure: correlation analysis, 2 PRC test: income-share test (simple regression) and time-trend test.	apparent in developed nations. 1) There is a significant relationship between GDP and advertising expenditures across nations, however it is dependent on the types of mass media. No control variables are significant in any model. The results of both simple and multiple regression analysis with control variables as well as GDP posits that only GDP is significant in predicting the advertising expenditures. 2) Nations with higher correlation in total advertising expenditure and GDP enjoy a higher degree of economic freedom. There seems to be national characteristics that might influence the associations between GDP and advertising spending, thus countries influenced by the PRC theory tend to have relatively higher economic openness, economic freedom and press freedom. Nevertheless, it was not identify any statistically significant variables other than GDP in determining advertising expenditures.
"Economic Growth and Advertising Expenditures in Different Media in Different	2008. van der Wurff Piet Bakker & Picard	21 countries, long-time members of the OECD: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany,	H1: Advertising intensity increases in time and is higher in countries where the primary sector is less important, the secondary and tertiary sectors are more important, a smaller share of production is exported	Countries are classified into three groups with cluster analysis: 1. Countries with relatively high proportion of GDP on advertising: newspapers have low

Countries”		Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States. 14 years (1987-2000, inclusive). Advertising expenditure data in 6 different media: newspaper, magazines, TV, radio, cinema and outdoor.	and per capita GDP is higher. H2: Advertising intensity of a single medium is not influenced by the advertising intensity of other media and varies in time as well as with per capita GDP. H3: The responsiveness of advertising expenditures to changes in GDP is higher for print media (newspapers, magazines) and outdoor advertising than for electronic media (television, radio, and cinema). H4: The responsiveness of advertising expenditures to changes in GDP is higher in countries where newspapers have a larger share in total advertising expenditures, and advertising intensity is higher. Linear regression for H1, H2 and H4, and ANOVA for H3.	advertising market share. 2. Countries with moderate advertising intensity: more than half of the advertising expenditure is allocated in newspapers. 3. Countries with low advertising intensity: advertising market share for newspapers low, television is the most important advertising medium. The most important sector for the countries in the sample is manufacturing. (H1 partly confirmed) Advertising is higher in countries where manufacturing is more important, and where exports are less important. Advertising intensive also increases in time. The size of the primary and tertiary sectors does not have anticipated effects on advertising expenditures. Advertising intensity is negatively related to per capita GDP and decreases with the size of the electricity sector. (H2 confirmed) Advertising intensity per medium varies with per capita GDP and time but is not influenced by the advertising intensity of other media. Magazines and radio are to some extent substitutes. However, in all other cases, growth in the advertising intensity of one medium is not accompanied by decline and sometimes even by growth in the advertising intensities of other media. H3 confirmed: Advertising expenditures in newspapers,

				magazines, cine and outdoor decrease 2% to 3% per year during recessions and advertising expenditures for TV and radio do not differ significantly between recession and growth years. H4 confirmed. Advertising expenditures respond more closely to changes in GDP when newspapers are a more important advertising medium and a large proportion of GDP is spent on advertising
"The Role of National Culture in Advertising's Sensitivity to Business Cycles"	2009. Deleersnyder, Dekimpe,. Steenkamp & Leeflang	37 countries, accounting for 84% of the worldwide ad spending in 2004: 16 European, 3 north-American, 3 south-American, 12 Asian, 2 oceanic and 1 African. Advertising expenditure data on four media: magazines, newspapers, radio and television, and the total advertising expenditure (including smaller media spending such as outdoor and internet) for each country. In total, there are 118 country-media combinations between 1980 and 2004.	H1: Advertising expenditure is less sensitive to business-cycle fluctuations in countries with a cultural long-term orientation. H2: Advertising expenditure is less sensitive to business-cycle fluctuations in countries high in cultural power distance. H3: Advertising expenditure is more sensitive to business-cycle fluctuations in countries high in cultural uncertainty avoidance. H4: Advertising expenditure is more sensitive to business-cycle fluctuations in countries high in cultural collectivism. 3 steps methodology: 1. Extract the business-cycle component 2. Quantify the extent of cyclical sensitivity 3. Explain cross-country differences	There is a considerable variability in the total amount of advertising and percentage of GDP spent in advertising between the studied countries. Differences are also observed between developed economies. Thus, it exists cross-national differences in the advertising environment. For all countries, the largest proportion of advertising is typically spent on newspapers and television. The majority of country-medium comovement elasticities are procyclical. Advertising is elastic with respect to business-cycle fluctuations. H1, H2 and H3 are confirmed. However for H4: there is no effect of cultural collectivism on advertising's comovement elasticity.

In this framework, we try to revisit the relationship between advertising expenditures and economic growth, measured by GDP. In particular, we want to evaluate the responsiveness of advertising expenditures to changes in GDP controlling unobservable heterogeneity and exploring the potential bias when different types of media are considered.

3 ECONOMIC FRAMEWORK

The purpose of this paper is to verify the existence of asymmetries in the relationship between economic growth and advertising expenditures, by media, by using a panel of 15 European countries over the period 2002-2012. To carry out this task, we start our empirical analysis with an assessment of unit root condition. In particular, we start by applying the panel unit root test proposed by Im et al (2003) (IPS test, henceforth) and Levin et al (2002) (LLC, henceforth). As it is well known, the IPS test is based on the following model:

$$\Delta x_{it} = \alpha_i + \beta_i x_{i,t-1} + \sum_{j=1}^{k_i} \rho_{ij} \Delta x_{i,t-1} + \mathcal{E}_{it} \quad i = 1, \dots, N; t = 1, \dots, T \quad (1)$$

where Δ is the first difference operator, x_{it} is the series for country i in time period t, k_i is the number of lags selected from the AIC method and $\mathcal{E}_{it}$ are iid variables with zero means and finite variances.

In this framework, the IPS test treats to check the null of a unit root for each country in the panel, whereas the LLC test assumes the null that the coefficients of autoregressive term are homogenous across countries against the alternative which assumes that all single series are stationary. In order to look for robustness, we also ran two additional tests: the Hadri and Breitung tests. The Breitung test checks the null hypothesis of a unit root. The Hadri test, by contrast, has the stationarity as null hypothesis. In order to complete the analysis the Fisher-ADF and the Fisher-PP panel unit root tests (Maddala & Wu, 1993) are also reported.

After this analysis, we look for cointegration. In particular, we deal with an adaptation of the Engle-Granger (1987) cointegration test, due to Pedroni (1999, 2004), for cointegration in panels.

In particular, Pedroni (2004) proposes a test which allows heterogenous intercepts and trend coefficients across cross-sections. The logical of this test is as follows. Consider the model, where *x* and *z* are two variables integrated of order one.

$$x_{it} = \alpha_i + \lambda_i t + \beta_i z_{i,t} + \varepsilon_{it} \quad (2)$$

In this framework, the logic of the Pedroni's test is given by a null of no cointegration assuming that the residuals have a unit root and the test is based on the following statistic.

$$\frac{N_{N,T} - \mu\sqrt{N}}{v} \quad (3)$$

which is asymptotically normally distributed, and where μ and v are obtained by using Monte Carlo simulations.

After running this test, we report the estimates of model (2) without trend, by means of a fully modified OLS. These estimates are based in the same scheme but considering cross-section intercepts and homogeneous coefficients. In particular, the model with no trend is now given by:

$$x_{it} = \alpha_i + \beta z_{i,t} + \varepsilon_{it} \quad (4)$$

4 RESULTS

By using our panel data of GDP and advertising expenditures for different media for EU-15 during the span 2002-2012, and following the previous strategy we first we first examine the stationary properties of the GDP and advertising expenditures for different media series.

All data are derived from ZENIT Media. For all countries, we have advertising data and GDP data for 13 years, from 2000-2012, i.e. an expansion and a recession.[1] Advertising

[1] GDP is measured in constant US Dollars (2010).

data includes seven media, namely newspapers, magazines, TV, radio, cinema, outdoor and the internet.

For this purpose, we use a battery of traditional panel unit root tests: the Fisher-ADF and the Fisher-PP, proposed by Maddala and Wu (1999), and tests proposed by Hadri (2000), Breitung (2000), Levin, Lin and Chu (2002), and Im, Pesaran and Shin (2003). The null hypothesis of non-stationarity can be rejected in almost all the cases, while the hypothesis of non-stationary – the Hadri test- it is non-rejected in all the cases. As a result, considering cases, the results reported in table 1 appear to be consistent. For both, GDP and advertising expenditures (aggregate and by media), the null hypothesis of unit root is accepted in cases of both common unit root classes of tests and individual unit root classes. In particular, the Hadri test for all series point to *I(1)*.

Table 1. Unit root tests in panel data (in logs).

Statistic	**GDP**	**Advert.**	**Cinema**	**Internet**	**Magaz.**	**Newsp**	**Outdoor**	**Radio**	**TV**
LLC	-1.396	-1.668**	-2.512***	-0.724	-1.314*	-4.278***	-0.850	-2.018**	-0.347
Breitung	-1.425	-1.055	2.299	0.289	3.325	-0.073	2.491	4.500	-0.016
IPS	2.196	-1.001	-0.622	1.484	2.310	-0.021	1.613	0.208	0.499
Fisher-ADF	13.734	24.243	37.618	13.662	19.223	37.192	24.300	37.857	30.420
Fisher-PP	8.469	20.690	53.406***	10.693	21.876	27.196	13.652	24.337	38.377
Hadri	6.962***	6.053***	5.319***	5.888***	6.191***	6.844***	6.480***	5.293***	5.242***

Notes: LLC and IPS represent the panel unit root tests of Levin et al. (2002) and Im et al. (2003), respectively. Fisher-ADF and Fisher-PP represent the Maddala and Wu (1993) Fisher-ADF and Fisher-PP panel unit root tests, respectively. *** indicates statistical significance at the 1 percent level. Probabilities for Fisher-type tests are computed by using an asymptotic chi-square distribution. All other tests assume asymptotic normality. A time trend and an intercept are included in all underlying specifications. The modified AIC was used to select the optimal lag length.

Since the hypothesis of unit root has been accepted we can look if the GDP, and the different measures of advertising (aggregate and by media) are cointegrated. The relationship has been analyzed by using both Pedroni's test. Results point to a non-rejection of the null of no cointegration, for the set of statistics included in this test.[2]

Table 2. Panel cointegration test (Pedroni Residual cointegration test)

Statistic	**Advert.**	**Cinema**	**Internet**	**Magaz.**	**Newsp**	**Outdoor**	**Radio**	**TV**
Panel v-Statistic	2.779***	0.718	3.125***	6.435***	8.221***	1.165	0.275	2.443***
Panel rho-Statistic	1.146	1.670	0.526	1.603	1.491	1.773	1.384	0.769
Panel PP-Statistic	-1.878**	-1.207	-4.378***	-1.396*	-1.682**	-0.090	-0.980	-2.398***
Panel ADF-Statistic	-2.218**	-3.186***	-4.167***	-2.387***	-4.114***	-2.024**	-2.413***	-2.172**
Group rho-Statistic	1.878	2.626	2.214	2.817	2.607	2.059	1.908	1.378
Group PP-Statistic	-5.441***	-1.125	-3.200***	-0.833	-1.361*	-2.461***	-4.035***	-5.902***
Group ADF-Statistic	5.439***	-2.299**	-3.353***	-3.812***	-5.075***	-2.052**	-4.981***	-5.995***

The results for the panel cointegration regression of equation (4) in logs, are shown in table 3, where columns show the aggregate Ad spending, and for the seven types of media considered. The panel group FMOLS estimate for Advertising spending is 0.924 being statistically significant. Then we cannot reject that it exists a statistically significant relationship between GDP growth and the advertising expenditure, thereby indicating that the economic development-advertising expenditure hypothesis is reasonable.

[2] Since the data are panel cointegrated but not necessarily cointegrated at the country level, we do not report estimates for individual countries.

Our results confirm previous ones in the sense that aggregate advertising intensity is higher where per capita GDP is higher. However, when we explore the relationship by media, the picture is more complex and with some controversial results with regard previous findings. Thus, the responsiveness of advertising expenditure in newspapers is not statistically significant to changes in GDP. By contrast Internet and TV show a higher advertising intensity than the other medium (outdoor or radio). Finally Magazine and Cinema are showing a decreasing evolution in such way that newspapers, magazine and cinema are losing relative weight in the aggregate advertising expenditure as the economy is richer.

Table 3. Cointegration regressions (panel FMOLS). Endogenous variable: log GDPit

Statistic	**Advert.**	**Cinema**	**Internet**	**Magaz.**	**Newsp**	**Outdoor**	**Radio**	**TV**
β_M	0.924***	-0.826*	16.232***	-1.250**	-0.584	0.624**	0.725**	1.130***
	(0.224)	(0.445)	(0.976)	(0.583)	(0.445)	(0.278)	(0.279)	(0.306)
R2	0.984	0.965	0.889	0.925	0.951	0.977	0.981	0.978

5 CONCLUSIONS

This study tested the existence of a long-run relationship between aggregate advertising expenditure and the economic development for a sample of European countries. In addition, this relationship was also explored by media. In both cases, the null of no cointegration was rejected irrespectively the residual cointegration test employed. By using panel cointegration regressions we update previous analysis, providing some new results. Thus, and opposite to previous analysis, we provide evidence on the lack of relative weight of newspapers, cinema and magazine, and a high advertising intensity of growth for TV and internet.

The use of new econometric approaches exploiting the pooled dimension of the data or the emergence of some radical changes after the crisis could be behind these new results.

REFERENCES

Ashley, R., Granger, C. W. J., & Schmalensee, R. 1980. Advertising and aggregate consumption: An analysis of causality. *Econometrica*, 48(5), 1149–1167.

Chang, B.-H., & Chan-Olmsted, S. M. 2005. Relative constancy of advertising spending. A crossnational examination of advertising expenditures and their determinants. *Gazette*, 67(4), 339–357.

Dimmick, J., 1997. The theory of the niche and spending on mass media: The case of the "videorevolution." *Journal of Media Economics*, 10(3), 33–43.

Granger, C. W. J., 1969. Investigating Causal Relations by Econometric Models and Cross-spectral Methods. *Econometrica* 37 (3), 424–438.

Hadri, K., 2000. Testing for stationarity in heterogenous panel data. *Econometrics Journal*, 3, 148-161.

Im, K.S., Pesaran, H. and Shin, Y., 2003. Testing for Unit Roots in heterogenous panels. *Journal of Econometrics*, 115, 53-74.

Johansen, S., 1988. Statistical Analysis of Cointegration Vectors. *Journal of Economic Dynamics and Control*, 12, 231-54.

Levine, A., Lin, C.F., Chu, C.S.J., 2002. Unit root test in panel data: asymptotic and finite simple properties. *Journal of Econometrics*, 108, 1-24.

Ostheimer, R. H. 1980. Magazine advertising during recessions. *Journal of Advertising Research*, 20(6), 11–16.

Pedroni, P. 1999. Critical Values for Cointegration Tests in Heterogeneous Samples with Multiple Regressors, *Oxford Bulletin of Economics and Statistics*, SI, 653-70.

Pedroni, P. 2004. Panel Cointegration: asymptotic and finite sample properties of pooled time series tests with an application to the PPP Hypothesis, *Econometric Theory* 20, 597–625.

Pesaran, M. 2006. Estimation and Inference in Large Heterogeneous Panels with a Multifactor Error Structure. *Econometrica.* 74, 967-1012.

Pesaran, M. and Smith R. 1995. Estimating Long-Run Relationships from Dynamic Heterogeneous Panels. *Journal of Econometrics* 68, 79-113

Picard, R. G., 2001. Effects of recessions on advertising expenditures: An exploratory study of economic downturns in nine developed nations. *Journal of Media Economics*, 14(1), 1–14.

Picard, R. G., & Rimmer, T., 1999. Weathering a recession: Effects of size and diversification on newspaper companies. Journal of Media Economics, 12(1), 1–18.

Shaver, M. A., & Lacy, S. 1999. The impact of intermedia and newspaper competition on advertising linage in daily newspapers. *Journalism and Mass Communication Quarterly*, 76(4), 729–744.

Shaver, M. A., & Shaver, D. (2005). Changes in the levels of advertising expenditures during recessionary periods: A study of advertising performance in eight countries. Paper presented at the Asian-American Academy of Advertising, Hong Kong.

Van der Wurff, R., Bakker, P. and R.G. Picard, 2008. Economic Growth and Advertising Expenditures in Different Media in Different Countries. *Journal of Media Economics*, 21, 28-52.