

## ADVERTISING AS A POSSIBLE DETERMINANT OF PRIVATE CONSUMPTION<sup>1</sup>

L. Grochová

**Received: July 7, 2010**

### Abstract

GROCHOVÁ, L.: *Advertising as a possible determinant of private consumption*. Acta univ. agric. et silvic. Mendel. Brun., 2011, LIX, No. 4, pp. 97–104

Private consumption represents an important component of aggregate demand, i.e. private consumption becomes a significant aspect of GDP determination. The objective of this paper is to examine private consumption in terms of a potential short-run influence of advertising on private consumption as one of the factors that determine consumption. GDP (disposable personal income), interest rates, but also advertising may be considered as important factors that can accelerate the development or change the direction of development of private consumption. A debate on effects of these factors is carried on in the paper. Determinants of advertising expenses as well as potential influence of advertising on private consumption will be studied. This general theme will be specified under conditions of American economy and examined during a period of almost 80 years (1929–2008). The GLS method of estimation with application of Cochrane-Orcutt regression is used. Despite of lower statistical significance the model indicates that advertising expenses variable is not an important variable of private consumption at aggregate level on the contrary to disposable personal income and private savings.

advertising, private consumption, private savings, personal disposable income, interest rates, GDP

The paper serves as an initial analysis of private consumption in the USA during the period 1929–2008. When the determination of consumption is understood (in our case at aggregate level) it can help in influencing (stimulating) this part of aggregate demand. Consumption is an extremely important component of aggregate demand, because of its influence on economic growth and economic cycles. There is a reciprocal relationship hence consumption (and its components) influences GDP and *vice versa* the level of GDP and the changes of GDP determine consumption. Therefore a study of private consumption and its determinants is relevant.

The paper, dealing with the mentioned problems, is organized as follows: first, determinants of private consumption are identified and scrutinized.

Consequently, the data and methods are introduced. Finally, a potential role of advertising in the process of consumption determination and distortions in consumption is modelled and debated.

### Literature review

An examination of advertising effects on private consumption is not so common argument as the study of advertising at microeconomic level. Though, several studies dealing with the problem can be mentioned.

In the first study that we mention, Verdon, McConnell, and Roesler (1968) employ monthly data and examine a possible relationship between advertising and GDP. Resulting correlation demonstrates no clear pattern. Consequently, criticizing the previous study Ekelund and Gramm

<sup>1</sup> Results published in the paper are a part of the research project 6214648904 “on the theme 01“/Macroeconomic and microeconomic performance of the Czech economy and macroeconomic policy of the Czech government under condition of integrated European market/” were realised with the financial support of the Czech government.

(1969) argue that rather private consumption than GDP should be used for the analysis. They base their research on de-trended quarterly data and find that the resulting regression is insignificant and more possible serial correlation problems are present. The same sample of data is used by Schmalensee (1972). He employs lagged (previous quarter's) advertising as an instrument to deal with endogeneity problem and his conclusion does not support the relationship between advertising and consumption either. Schmalensee's work, however, suffers from missing test of significance. Seldon and Jung (1995) regress aggregate consumption on advertising and lagged consumption gaining a positive relationship. However, the model is only bivariate and may omit number of relevant variables in the specification of private consumption, as for example disposable private income, interest rates, etc.

In a critique of missing variable Guo (2003) adds disposable income to enrich the model using annual data and as a majority of the studies also he does not prove that advertising has an impact on private consumption.

### Determinants of private consumption

When focusing on consumption Wilk (1999) confirms (as implies from the studies above) that it has diverse causes rather being the product of a single event and that consumption is always a result of balances between factors.<sup>2</sup> The factors that influence consumption as defines Piana (2001) are the following: disposable personal income (DPI), private savings, interest rates, expectations about DPI, price levels, and non-economic factors as, for example, advertising. Because of the fact that in all previously mentioned studies all these factors were not included we want to extend them specifying so the private consumption determination by formalizing Piana's ideas, i.e. to create a model in which all mentioned variables are considered.

To analyze the effects of the variables on consumption it is necessary to underline the determinants of each factor.

Nowadays, in connection with economic recession rightly **GDP** evolution is often mentioned and studied. From our point of view it is an important factor and its evolution determines the evolution of private consumption through disposable personal income.

**Private savings** affect consumption especially in a cumulated form. Savings can be an outcome of negative expectations about future income,

can be the result of sharply rising income, with contemporary higher consumption or can arise from a compulsory tendency of renouncing and postponing consumption.

Private savings depend on economic evolution and economic cycles. When a recession begins, people hoping it represents only a short-run decrease keep (if possible) the same level of consumption, so they reduce private savings. When the problems going along the recession are more clearly visible and previously cumulated saving buffers are exhausted, the households usually adapt to lower level of consumption, trying to rebuild the buffers. However, when expecting optimistic economy evolution, savings may be driven down until the fast growing income will allow both higher consumption and savings.

The effect of the **interest rate** on consumption behaviour is a following point of interest of the paper. Modigliani and Brumberg (1954) write that the interest rate plays an important role in measuring the consumer's expected future earnings which, in turn, influence consumption. Friedman's (1957) in his permanent income hypothesis considers interest rate to become a major determinant of the marginal propensity to consume out of permanent income. We follow these studies and include interest rate in our model regarding it as one of factors determining consumption. According to our results we will either support or contradict Wright's (1967) estimates of negative and significant relationship between the interest rate and consumption expenditure.

Consumption in her evolution is determined by many non-(directly)-economic factors among which **advertising** on which the contribution focuses its attention. Advertising related to consumption gives a rise to problems as the influence of advertising on consumer information and knowledge, its persuasive power, its ability to create emotions, advertising effects on rationality and sovereignty.

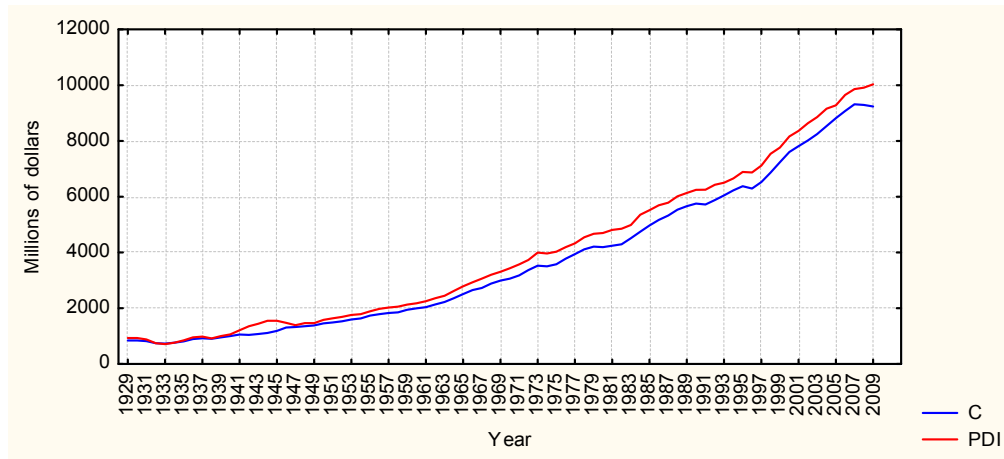
Informative advertising helps to quicker adoption and diffusion of new products among consumers by breaking or modifying existing consumption routines. **Informative advertising** provides information about commodities and it is used mainly in order to present new products and services. It can inform about price change and a way of use. Decisive role of advertising can be then seen when introducing new products at the market. Absence of advertising would imply a delay in consumption; hence advertising accelerates familiarization with the product and creates habit behaviour (Brink and Kelley, 1963: 300).

<sup>2</sup> When explaining consumption it is important to present aspects that determine consumption among which institutional framework, its evolution or uncertainty. With these aspects limited information (implying asymmetric information) is connected. The latter is fundamental for the phenomenon of advertising that is why it is discussed later more in detail (for more information on advertising at microeconomic level see Laband, 1986; Bagwell and Ramey, 1990; Grossman and Shapiro, 1984; Spence, 2002; Nelson, 1974 a, b; etc.). More, an individual makes use of neither adequate experience nor calculation abilities to elaborate on the information. An individual chooses only from a limited collection of alternatives.

Also **persuasion** by means of advertising can affect consumption but mainly at microeconomic level.<sup>3</sup> It may reinforce consumption by underlying driving factors such as status, image and positive emotions. It is aimed to change consumer preferences and behaviour. One of implications of persuasive advertising is conspicuous consumption (Galbraith (1998[1958]: 127–128) and concentration

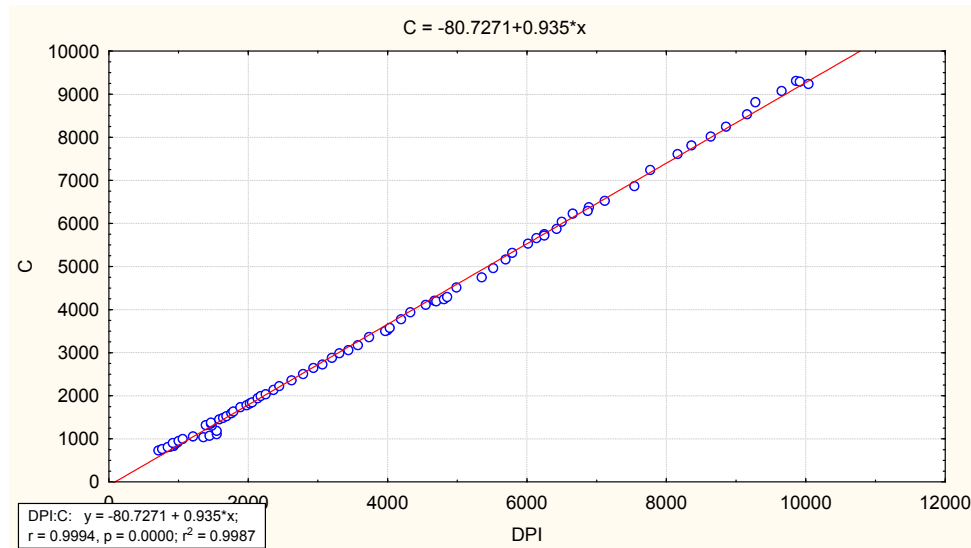
of society on material values. From this point of view persuasive advertising should have significant effect on individual demand where it can transfer consumers from one brand to another one but a moderate effect on aggregate demand.

In the paper we consider an overall effect of advertising without examining a persuasive/informative nature of this marketing tool.



1a: *DPI and private consumption expenditures evolution (1929–2008)*

Source: NEA, AEs, author's elaboration.



1b: *Dependence of private consumption on disposable personal income (basic consumption function)*

Source: NEA, AEs, author's elaboration.

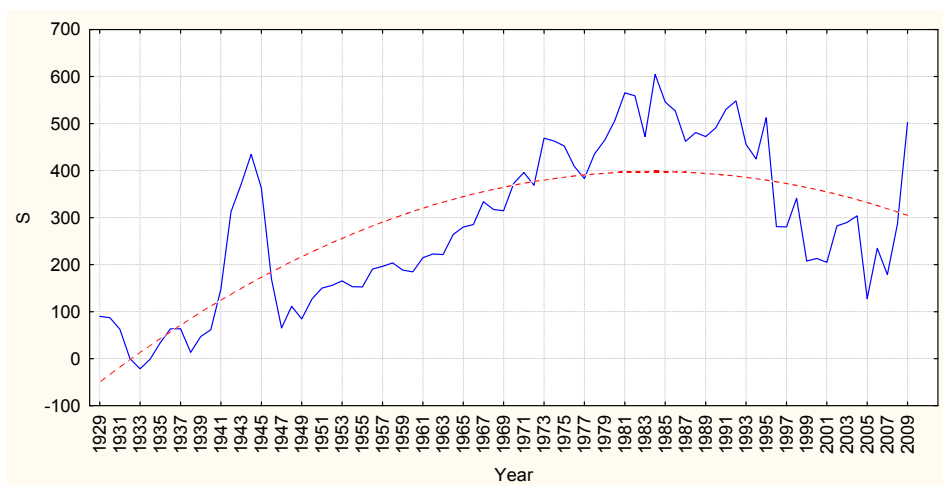
3 There are social factors and institutions that significantly contribute to the creation of attitudes, interests and behaviour models. Among these, reference group, family and groups with which an individual is more or less in regular contact can be mentioned. A certain group implies a social status with which a certain need is associated. By purchasing luxury or position goods, an individual demonstrates his belonging to a higher social class (demonstrative effect). This tendency may be reinforced by advertising and leads to conspicuous consumption (see Veblen, 1994 [1899]; Galbraith, 1998 [1958]). Advertising effect and then consumption are also dependent on consumer age, profession (and so by income), lifestyle (value hierarchy), and so on. The last group includes psychological factors: motivation, perception, learning and attitudes.

## DATA AND METHODOLOGY

Because of an absence of European advertising expenses U. S. annual data are chosen. They are all in real terms and cover a period from 1919 (1929) to 2008. Data comprise total advertising expenditures and interest rate obtained from Douglas A. Galbi (purplemotes.net), GDP, private consumption expenditures, disposable personal income (DPI), and private savings published at pages of National Economic Accounts (NEA, <http://www.bea.gov/national/index.htm>) and American Economy statistics (AEs, <http://www.nationmaster.com/statistics>). All data are elaborated and used at aggregate level.

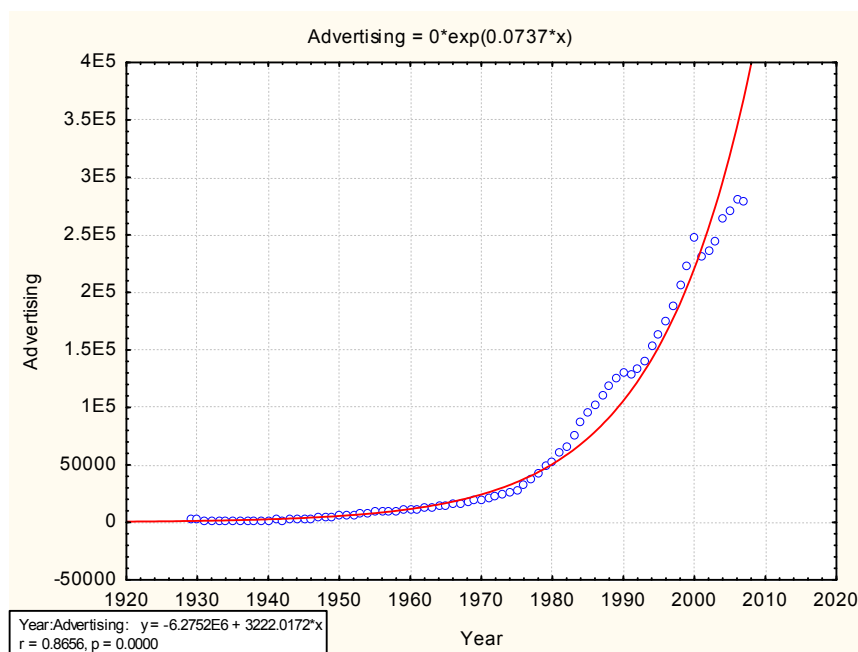
As for DPI it naturally reflects GDP evolution during the whole period. The relationship between these variables is generally known so it will not be described in details. DPI consequently influences consumption level what can be observed in the Fig. 1 a, b. We can see a strong dependence of American consumption on DPI (Fig. 1b), i.e. as DPI grows it causes changes in consumption in the same direction (Fig. 1a).

Next determinant of private consumption are private savings. In United States, private savings generally tend to increase during recessions (see Fig. 2). The plot shows a significant growth during World War II. Private savings after a period of creating saving buffers (from 70's to 90's) dramatically



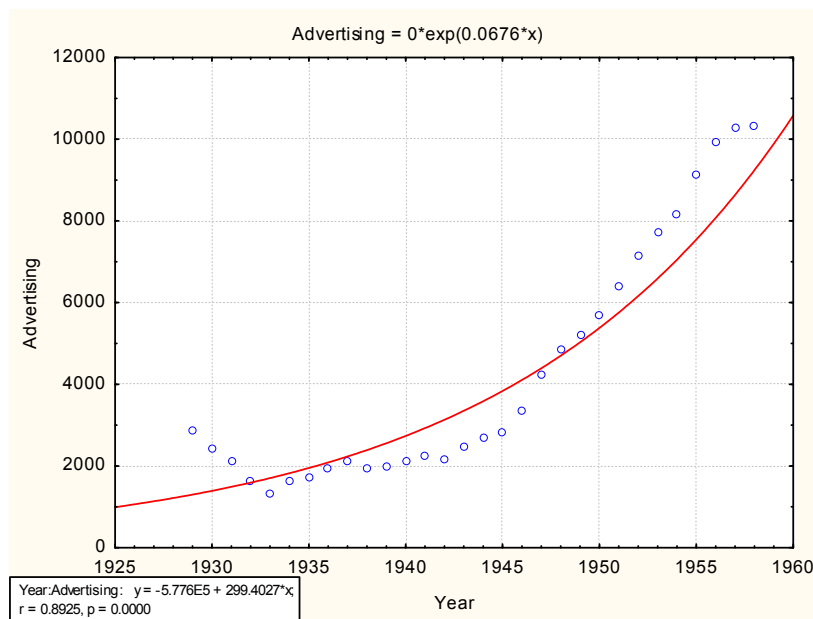
2: Evolution of private savings in the U. S. A. (1929–2008)

Source: NEA, AEs, author's elaboration.



3a: Evolution of total advertising expenditures in the U. S. A. (1929–2008)

Source: NEA, AEs, author's elaboration.



3b: Detailed scatter plot of evolution of total advertising expenditures in the U.S.A. (1929–1960)  
Source: NEA, AEs, author's elaboration.

fallen in the last decades. More in general, it seemed to be a general tendency of reduction in savings until the beginning of last recession in 2008. In 2008 some indications of the same reaction in savings as during World War II can be seen.

Advertising, as one of marketing stimuli, has been aiming to affect consumption for some decades and recently becomes more and more intense (see Fig. 3a and 3b). It can be seen advertising expenditures copy the evolution of GDP until wartime period. There are declines in economic recession in 1929 and 1937. From World War II each economic recession (1945, 1953, 1973, and 1991) does not cause advertising expenditures fall but only a slowdown with the exception in 1983 when expenditures on advertising reflected a short recession and in 2001 there is a striking drop in advertising expenditures. Nowadays recession rather reduces than decelerates expenditures on advertising and it should, according to history evolution, copy trends of economy that is slowly recovering. In the next section a study of importance of this factor in forming consumption will be carried out.

The data are tested for stationarity with Dicky-Fuller and Elliot-Perron tests, for endogeneity with Hausman-Wu test and for correlation with Durbin-Watson test. As for methods, OLS, 2SLS, and GLS are used for the estimation.

The model starts from Piana (2001)<sup>4</sup> rationale who claims that aggregate consumption is determined by disposable personal income (with a relation to GDP), private savings, interest rates, expectations about DPI, price levels, and non-economic factors

as advertising. Because of the lack of data connected with limited space for the paper, inspiring us by Modigliani and Brumberg (1954) we consider interest rate as a *proxy* for expectations about DPI variable.

To decide whether the real advertising expenses depend (or not) on the fluctuation of economy a relation between advertising expenditures and GDP is examined.

## RESULTS AND DISCUSSION

Generally, when using time series that are not stationary sterile results may be obtained (Enders, 1995). To control for stationarity of time series Dicky-Fuller and Elliot-Perron tests are used. All the series result to be stationary when being in the first-order differentials. This implies a study of short-run effects of independent variables on private consumption. Long-run effects can be examined with a co-integration analysis that is, however, beyond the scope of this study.

The estimation can be burden with endogeneity of variables and correlation among variables. The first problem can be detected with Hausman-Wu test. The model estimation starts with assumption that all explanatory variables are exogenous. Because of the fact that total advertising expenditures may be influenced by economic development (when they are calculated as a percentage of revenues) and private savings are the function of disposable personal income and consumption it is necessary to test the total advertising and private savings if

4 Piana (2001) when stating (especially the economic) determinants is inspired by Keynes (1936).

they are independent on error terms. Hausman-Wu test shows that total advertising expenditures and private savings variables are endogenous and cause also the whole model to be endogenous. It can be resolved by a method of estimation that includes instrumental variables (IV). As an instrumental variable for total advertising expenditures we use total revenues of firms because advertising expenditures are usually stated as a percentage of total revenues and still they do not influence consumption. As for private savings we use lag-variable as an instrument regarding them natural candidates for instruments inspiring ourselves by Chintagunta and Jain (1995).

Because of a strong correlation among errors that is revealed by Durbin-Watson d-statistic (5, 79) = 1.889002<sup>5</sup>, estimation of parameters is continued with GLS applying Cochrane-Orcutt regression AR (1).

The results are reported in Tab. I.

We start with the model estimation corrected for autocorrelation. Although statistically less significant the resulting model explains *circa* 90% of reality so it could be considered to be a comprehensive model. The results demonstrate 1% significance for DPI and private savings variables. These show that a change in personal disposable income cause *circa* the same change in private consumption expenditures while a change in private savings has a negative effect on private consumption expenditures. 1% increase in private savings

implies 0.68% decrease in private consumption. The estimation of remaining variables results less statistically significant.

In the contrary to marketing literature advertising expenditures change seems to have, if any, only a minimum impact while change in interest rates has rather negative one to one ratio impact on consumption expenditures change. These would have a serious implications that are in line with Schmalensee (1972) and Guo (2003) consisting in an inability of advertising expenses at aggregate level to stimulate private consumption expenditures and accordingly aggregate demand (with a possible anti-cyclical effects). Other findings would result as it was expected and would confirm a theoretical background of the study, however, the model does not prove to be statistically significant which implies that any relevant conclusions cannot be made on the basis of these results.

A weakness of our model is then a lower statistical significance being a challenge to extend our contribution successively. It could be improved either by more detailed analysis based on individual data where more effects may be observed and/or by an analysis based on quarterly data where less information is lost. Another ambition that is not possible to be fulfilled in the present paper because of unpublished recent data in 2009 could be more detailed analysis of studied variables during economic recessions. This argument remains open for another study.

I: Private consumption expenditures estimation

	OLS	OLS robust <sup>6</sup>	AR (1)	AR (1) Cochrane-Orcutt	IV
D.c					
D. DPI	1.013 (0.050)**	1.013 (0.041)**	1.014 (0.042)**	1.014 (0.043)**	0.928 (0.187)**
D. Advertising	-0.001 -0.001	-0.001 -0.001	-0.001 -0.001	-0.001 -0.001	0.001 -0.004
D. S	-0.799 (0.068)**	-0.799 (0.155)**	-0.795 (0.157)**	-0.796 (0.156)**	-0.68 (0.228)**
D. Interest	-0.697 -0.874	-0.697 -0.573	-0.718 -0.579	-0.72 -0.582	-1.081 -1.171
Constant	-2.293 -5.435	-2.293 -4.468	-2.329 -4.58	-2.455 -4.75	1.068 -8.273
Observations	79	79	79	78	79
R-squared	0.91	0.91	0.9	0.9	

\* significant at 5%; \*\* significant at 1%

Standard errors in parentheses

Robust standard errors in parentheses

Source: author's elaboration.

<sup>5</sup> Null hypothesis: errors are serially independent.

<sup>6</sup> OLS robust specifies the type of standard error reported that are robust to some kinds of misspecification, that allow for intra-group correlation. It is included to control for the overall estimate's small-sample properties.



## CONCLUSION

The aim of this paper was to examine a potential influence of advertising on private consumption as one of possible factors that can determine consumption. Both economic (disposable personal income, personal savings, interest rates) and non-economic factors (advertising, demographic aspects, etc.) may affect the studied variable that presents an important part of aggregate demand. Understanding its determinants private consumption (being a part of aggregate demand) may be influenced in an anti-cyclical way. Thus, a potential influence of economic and non-economic aspects as factors creating and affecting private consumption has become the object of our interest.

American time series (1929–2008) are used for this purpose and are obtained from National Economic Accounts, American Economic Statistics, and Douglas A. Galbi – an economist who collects data of this kind. Because of a correlation among errors private consumption is estimated with GLS applying Cochrane-Orcutt regression. Instrumental variables are used in order to control for endogeneity.

According to our empirical results the most important factors to create changes in consumption are changes in disposable personal income and private savings. Particularly, 1% increase in DPI augments consumption by 0,93%, while a positive change in private savings reduces consumption by 0,68%. Interest rates seem to have negative and quite important (from 0,7 to 1,1 % in absolute values) effect. The variable on which our contribution was focused seems to be irrelevant in forming aggregate consumption, i.e. an expansion in advertising expenditures cannot augment private consumption expenditures.

## REFERENCES

- BAGWELL, K. and RAMEY, G., 1990: Advertising and Coordination [Discussion paper No. 903], Northwestern University, Center for Mathematical Studies in Economics and Management Science. Available at: <http://www.kellogg.northwestern.edu/research/math/papers/903.pdf>.
- BRINK, E. L. and KELLEY, W. T., 1963: *The Management of Promotion*, Englewood Cliffs, NJ: Prentice-Hall, Inc. ASIN B000VYR08K.
- CHINTAGUNTA, P. K. and JAIN, D. C., 1995: Empirical Analysis of a Dynamic Duopoly Model of Competition, *Journal of Economics and Management Strategy*, 4, 1: 109–31. ISSN 1058-6407.
- EKELUNG, R. B. and GRAMM, E. P., 1969: A Reconsideration of Advertising Expenditures. Aggregate Demand, and Economic Stabilization, *Quarterly Review of Economics and Business*, 9: 71–77. ISSN 1062-9769.
- ENDERS, W., 1995: *Applied Econometric Time Series*. USA: John Wiley & Sons. ISBN 0471230650.
- FRIEDMAN, M., 1957: The Permanent Income Hypothesis: Comment, *American Economic Review*, 48: 990–991. ISSN 0002-8282.
- GALBI, D. A., 2008: U.S. Advertising Expenditure Data. *Purple Motes* [online], 4, 9. [quot. 2010-2-28]. Available at: <http://purplemotes.net/2008/09/14/us-advertising-expenditure-data/>.
- GALBRAITH, J. K., 1998[1958]: *The Affluent Society*. Houghton Mifflin Company. ISBN 0-395-63751-1.
- GDP – composition by sector. NationMaster Central Data Source [online] [quot. 2010-2-23] <[http://www.nationmaster.com/red/graph/eco\\_gdp\\_com\\_by\\_sec\\_ind-economz-gdp-composition-sector-industry&int=1&id=us](http://www.nationmaster.com/red/graph/eco_gdp_com_by_sec_ind-economz-gdp-composition-sector-industry&int=1&id=us)>.
- Gross Domestic Product (GDP) [online]. National Economic Accounts [online] [quot. 2010-2-23] <<http://www.bea.gov/national/index.htm>>.
- GROSSMAN, G. M. and SHAPIRO, C., 1984: Informative Advertising with Differentiated Products, *Review of Economic Studies*, Blackwell Publishing, 51, 1: 63–81. ISSN 0034-6527.
- GUO, C., 2003: Cointegration Analysis of the Aggregate Advertising-Consumption Relationship. *Journal of the Academy of Business and Economics* [online] [quot. 2010-2-28]. Available at: [http://www.thefreelibrary.com/Cointegration analysis of the aggregate advertising-consumption...-a0113563620](http://www.thefreelibrary.com/Cointegration+analysis+of+the+aggregate+advertising-consumption...-a0113563620).
- KEYENES, J. M., 1936: *The General Theory of Employment, Interest and Money*. 1<sup>st</sup> edition, Palgrave Macmillan. ISBN 0230004768.
- KOTLER, P., 2003: *Marketing Insights from A to Z. 80 Concepts Every Manager Needs To Know*. USA: John Wiley and Sons, Inc. ISBN 0471268673.
- LABAND, D. N., 1986: Advertising as Information: An Empirical Note. *Review of Economics and Statistics*, 68: 517–521. ISSN 0034-6535.
- MODIGLIANI, F. and BRUMBERG, R. H., 1954: Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data. In: KURIHARA, K. K. (ed.), *Post-Keynesian Economics*, New Brunswick, NJ. Rutgers University Press. p. 388–436. ASIN B001NJEXA0.
- NELSON, P., 1974a: The Economic Value of Advertising. In: BROZEN, Y. and GENEEN, H. S. (eds.), *Advertising and Society*. New York: New York University Press, 43–66. ISBN 081470980X.
- NELSON, P., 1974b: Advertising as Information, *Journal of Political Economy*, 82: 729–754. ISSN 0022-3808.
- PAVILENENE, D., 2008: Lithuanian Marketing Experts See Bright Side of Economic Crisis, *International Internet Magazine* [online]. Vilnius, 2008-12-4. [quot. 2010-2-28] Available at: <http://www.baltic-course.com/eng/analytics/?doc=7709>.

- Personal Income and Outlays*. National Economic Accounts [online] [quot. 2010-2-23] <http://www.bea.gov/national/index.htm>.
- PIANA, V., 2001: Consumption. *Economics Web Institute Glossary* [online] [quot. 2010-2-23]. Available at: <http://www.economicswebinstitute.org/glossary/cons.htm>.
- SCHMALENSEE, R., 1972: *The Economics of Advertising*. Amsterdam: North-Holland. 312 p. ISBN 0720431808.
- SELDON, B. J. and JUNG, C., 1995: The Length of the Effect of Aggregate Advertising on Aggregate Consumption, *Economic Letters*, 48, 2: 207–211. ISSN 0165-1765.
- SPENCE, M., 2002: Signaling in Retrospect and the Informational Structure of Markets. *The American Economic Review*, 92, 3 (Jun., 2002): 434–459. ISSN 0002-8282.
- VEBLEN, T. B., 1994[1899]: *The Theory of the Leisure Class: An Economic Study in the Evolution of Institutions*. New York: Macmillan. 440 p. ISBN 0-486-28062-4.
- VERDON, W. A., McCONNELL, C. R. and ROESLER, T. W., 1968: Advertising Expenitures as an Economic Stabilizer, *Quarterly Review of Economics and Business*, 8: 7–18. ISSN 1062-9769.
- WILK, R., 1999: Towards a Useful Multigenic Theory of Consumption. *ECEEE Summer study proceedings, 1999* [online] [quot. 2010-2-23]. Available at: [http://www.ecee.org/library\\_links/proceedings/1999/pdf99/Panel3/3-15.pdf](http://www.ecee.org/library_links/proceedings/1999/pdf99/Panel3/3-15.pdf).
- WRIGHT, C., 1967: Some Evidence on the Interest Elasticity of Consumption. *American Economic Review*, 57, 4: 850–854. ISSN 0002-8282.

#### Address

Ing. Ladislava Grochová, Ph.D., Ústav ekonomie, Mendelova univerzita v Brně, Zemědělská 1, 613 00 Brno, Česká republika, e-mail: [ladislava.grochova@mendelu.cz](mailto:ladislava.grochova@mendelu.cz)