EUROPEAN Journal of Economic Studies

Has been issued since 2012.
E-ISSN 2305-6282
2018, 7(1). Issued 2 times a year

Journal is indexed by: **CrossRef** (UK), **EBSCOhost Electronic Journals Service** (USA), **Electronic scientific library** (Russia), **Open Academic Journals Index** (Russia), **ResearchBib** (Japan), **ULRICH's WEB** (USA).

All manuscripts are peer reviewed by experts in the respective field. Authors of the manuscripts bear responsibility for their content, credibility and reliability.
Editorial board doesn't expect the manuscripts' authors to always agree with its opinion.

Postal Address: 1367/4, Stara Vajnorska str., Bratislava – Nove Mesto, Slovak Republic, 831 04

Website: http://ejournal2.com/
E-mail: ejes2012@mail.ru

Founder and Editor: Academic Publishing House Researcher s.r.o.

Release date 23.03.18.
Format 21 × 29,7/4.

Headset Georgia.

Order № 113

European Journal of Economic Studies

2018

Is. 1

C O N T E N T S

Articles and Statements

Published in Slovak Republic
European Journal of Economic Studies
Has been issued since 2012.
E-ISSN: 2305-6282
2018, 7(1): 3-15

DOI: 10.13187/es.2018.7.3
www.ejournal2.com

Articles and Statements

Environmental Awareness of the Population: the Case of the Municipality of Voždovac (Belgrade)

Jelisavka Bulatović [a], Goran Rajović [a, *]

[a] College of Textile Design, Technology and Management, Belgrade, Serbia
[b] International Network Center for Fundamental and Applied Research, Washington, USA

Abstract

Environmental awareness is to understand the fragility of our environment and the importance of its protection. Promoting environmental awareness is an easy way to become an environmental steward and participate in creating a brighter future for our children. Before you can begin promoting environmental awareness in your own community you must first make sure that you have a thorough understanding of environmental issues. People's actions do not reflect such high levels of environmental consciousness (Ai Hiramatsu et al., 2015). Such contradiction between attitude and action has been mentioned in studies (see Stern, 2000; Kollmuss, Agyeman, 2002; Giuseppe, 2006; Ando et al., 2007; Harju-Autti et al., 2014). The aim of this paper is to review environmental awareness, for example Belgrade municiplaty Voždovac.

Keywords: municipality Voždovac, environmental awareness, research, survey.

1. Introduction

Environmental awareness according to Wielewska and Zuzek (2015) citing research Hull (1984) and Zarządzanie Ğrodowiskiem (2007) indicates that refers to the ideas, values, and opinions about the environment as a place in man's life and development, common for certain social groups during a historical period. It can also refer to the state of people's knowledge, opinions, and notions about the role of the environment in human life, including the state of knowledge about methods and tools for the management of using, protecting, and shaping the environment. People develop their environmental awareness under the influence of commonly accepted social norms, information in the mass media, and various forms of environmental education. Hull (1984) by Wielewska and Zuzek (2015) defining the concept of environmental awareness, gave it two dimensions: individual and collective. In the individual dimension, the term referred to experiencing ways of thinking about the natural environment by individuals, whereas in the collective dimension, it referred to standards of understanding, experiencing, and evaluating the biosphere. Environmental awareness is, according to him, "a form of social awareness manifesting itself both in the thinking and experiences of individuals and in standards of understanding, experiencing, and evaluating the biosphere which function in society".

* Corresponding author
E-mail addresses: jelisavka.bulatovic@gmail.com (J. Bulatović), dkgoran.rajovic@gmail.com (G. Rajović)

Attention is focused worldwide on the environmental change, inequalities in development, and political instability. There is awareness that the earth is one unit of interrelated activity, which can disrupt the single fragile ecosystem. Commoner thesis is that social, economic, technological, and political factors are important intervening factors between the environment and population views. Now the focus is on research (Clarke 1993). The goal of sustainable development for the present and future generations is important conceptually. Sustainable development implies that population activities must be integrated with environmental awareness. The UN Population Fund directs activity toward reordering priorities and emphasizes greater energy efficiency and resource conservation... Population-environmental education is best linked with human geography syllabuses, which pertain to multiple levels and periods of analysis and are sensitive to the great diversity of cultures, economies, politics, and environments (Clarke, 1993). In our example, we point out the ecological awareness of the population of the Belgrade municipality of Voždovac.

2. Area Research

Municipality of Voždovac is located in the southeastern part of Belgrade. It occupies an area of 14.864 ha, with about 167,000 inhabitants. Borders with municipalities: Vračar in the north, Zvezdara in the northeast, Grocka on the east, Sopot on the south, Barajevo in the southwest, Čukarica and Rakovica on west and Savski Venac in the northwest. The most important tourist potentials on the territory of the municipality of Voždovac are: mountain complex Avala with the Monument to the Unknown Hero, mountain home Čarapićev scope, area Šuplja rock, natural lake in the village Trešnja, artificial lake Bela River in Ripnj, artificial lake between settlements Pinosava and Resnik, memorial – park in Jajincima, house Vojvode Stepe in Kumodraž. On a wider space Avala as important tourism resources are identified thermal water, Zavojnička River as well as rural settlements Beli Potok, Zuce, hamlet Brđani, Pinosava with the possibilities of developing rural tourism or developing economic content in the function of tourism. However, nature itself took care to remind people of this fact. In the municipality of Voždovac, there are also Banjica Forest and several parks such as: Park Šumice, Park Jajinci, Memorial park Topovske sheds and wooded area Stepin grove (www.wikipedia.org).

3. Research Method

"A valid method that it is the shortest route, allows the attainment of its goals" (R. Descartes). Proceeding from these conclusions R. Descartes, we want to emphasize that the methodology in this paper is not an end in itself but as a completely and organically related to the subject line and functionally subordinate to the proclaimed goal. The whole procedure involved the conduct of research using the combined method for the observation with the key involvement, and creating and using the following sources: oral (survey), written (relevant literature). The results presented textually (see Bulatović, Rajović, 2013; Rajović, Bulatović, 2017a).

3.1. Sample

The sample included 305 inhabitants of the Municipality Voždovac. Sample included people of different age – sex distribution and educational level. Age range covered is from 18 to 60 years and over.

3.2. Instrument

For research purposes, we have created a curriculum. Questions divided into five categories: insight into environmental awareness, waste management, municipal infrastructure, environmental actions and of the state of the environment. The questionnaire made after the model of an instrument designed for the intentions of this research, using the formulation of rules of inquiry questions: Curry et al (2005), Yamada (2009), Anderson et al (2010), Pušić and Pajvančić-Cizelj (2012), Lekić and Jovanović (2015). The survey was, conducted by a group of students (young environmentalists) Higher Vocational School of the Textile Design, Technology and Management in Belgrade in the second half of 2015 and 2016 years under the direction of Professor Jelisavka Bulatović. In this context, in terms of results and their interpretation, we used to study Sumski (2007), Koković (2010), Säynäjoki et al. (2014), LEAP (2015).

4. Objective Research

The main aim is to determine the state of environmental awareness of residents. The basic starting point of research is the concept of active protection of the environment, in our example, the Municipality Voždovac is that the environment must been protected in advance as a whole. According to Sola (2014) "the involvement of public in the implementation of environmental education programmers and campaigns cannot be over-emphasized but this is not the case. Air, water and soil pollution is on the increase. To minimize these problems, environmental awareness is imperative (see Rajović, Bulatović, 2017b; Bulatović, Rajović, 2017a; Rajović, Bulatović, 2017d; Bulatović, Rajović, 2017b). Lack of adequate environmental knowledge is an obstacle in achieving a sustainable future for humankind at both global and local levels. Measuring the level of environmental awareness in a population can be difficult but environmental awareness programmed can help reduce the impacts of human activities on the environment". Educating adult, community, traditional and religious leaders on the importance of environmental health and on the well use of the natural environment by Sola (2014) is also very critical to sustainable development (see Rajović, Bulatović, 2017e; Bulatović, Rajović, 2017c; Rajović, Bulatović, 2017f).

5. Survey – Questions and Answers

Abiding by the rules of survey phrasing: Henson (1994), Bulatović and Rajović (2011), Bulatović and Rajović (2013), Gotkiewicz and Sternik (2014), Rajović and Bulatović (2015), Khajeshahkoohi et al (2015), Rajović and Bulatović (2015), Bulatović and Rajović (2016), Nišić et al (2016), Bulatović and Rajović (2016), Morrison and Beer (2017) we review the questions and answers given.

5.1. Analysis of Results and their Interpretations

Based on survey data, in the form of a short summary, we point to the following major findings:

- It is interesting that almost all respondents (92 %) declared to act environmentally responsible and that is something made for the benefit of the environment.
- With the term "sustainable development" was introduced more than half (55 %), but the alarming statistic that as many as them (34 %) is or has been partially aware of its true meaning.
- Questionnaire survey answers that only (33 %) of respondents knew the standards and legislation on environmental protection.
- On the question of whether a section, association or group of pupils/students who are actively engaged in issues of environment 48 % of them answered yes, 22 % with no, while not familiar 30 % of respondents.
- More than half (46 %) respondents of the municipality Voždovac classified domestic waste, while 54 % of the respondents do not.

Table 1. Results inquiry

Questions	**Reply in %**
1. What priority do you give to the environmental problems in municipality Voždovac?	
the most important	24
important, but we have bigger problems	52
not particularly important	23
not important	1

How would you describe the state of the environment in municipality Voždovac ?	
excellent	1
satisfactory	13
not satisfactory	54
bad	32
3. Who are the biggest polluters in municipality Voždovac ?	
agriculture	7
industry	37
utility companies	12
citizens	44
4. What are in your opinion the biggest environmental problems in municipality Voždovac?	
solid waste	26
water pollution	39
air pollution	16
soil pollution	19
5. What are the major factors that affect the state of the environment in municipality Voždovac ?	
poor level of civic and environmental awareness	63
inadequate and unenforceable laws	11
lack of experts in competent institutions	10
failure to comply with the environmental laws	17
6. Who are, in your opinion the key actors in environmental problem - solving?	
competent institutions	42
companies, potential and actual polluters	18
organized groups of citizens and NGOs	7
all citizens	33

7. Do you behave in an environmentally responsible?	
yes	92
no	8
8. Are you familiar with the term "sustainable development", and do you know it's true meaning?	
yes	55
no	34
partly	11
9. Do you know the standards and legislation on environmental protection?	
yes	33
no	4
partly	64
10. Is there a section in your neighborhood, association or group of pupils / students who are actively engaged in environmental issues?	
yes	48
no	22
I'm not familiar / familiar	30
11. I sort household waste?	
yes	46
no	54
11. You in your neighborhood separate collection for different types of waste (glass, paper, plastic, cans ...)	
yes	17
no	83
12. Is there in your neighborhood uncontrolled disposal of municipal waste?	
yes	66
no	34

13. Are you satisfied with the organization of municipal waste?

yes	29
no	71

14. What are your sources of information about waste and its disposal, landfill and protecting the living space?

TV	55
print	12
school / workplace	11
"story"	22

15. Did you know you just by law have the opportunity to propose initiatives on the location of municipal waste disposal and regulation of the settlement?

yes	25
no	75

16. Are you satisfied with the utility infrastructure of settlements?

yes	87
no	13

17. Are you well - known projects by the local government to protect the environment?

yes	26
no	42
I do not think about it	32

18. Do you think local government should do more for the purity of the settlement and improvement of environmental awareness?

yes	97
no	3

19. What should I do?

adopted important laws on environmental protection	34
for violations of the same draconian punish	

money helps	30
suggests important	20
projects on ecology	12
i do not think about it	2
a reason	2
20. Have you participated in any environmental action in your neighborhood?	
yes	30
no	70

Source: Calculating data from the authors.

- Separate collection of different types of waste (glass, paper, plastic, cans...). Are not represented in sufficient numbers so that the population is forced to dispose of waste without sorting the containers (83 %).
- More than half of respondents (66 %) declared the existence of uncontrolled waste dumping in town. As we saw on the ground, it is sufficient that only one truck unloading trash beside the road and within 24 hours the resulting "mini" dump.
- Only 29 % of respondents said they were satisfied with the organization of municipal waste disposal. If we consider that 71 % of respondents said they did not, it seems that there are dumpsites in the settlement. Here, in particular emphasizing the 23 "wild dumps" on the territory of the municipality.
- Television, it is quite obvious, the most powerful medium we use to inform people about these important issues. In second place printed. Schools and the workplace as a source of information as a warning, and are the last place. Even the impact of the information they hear from other "story" more. Poll suggests the following answers: television (55 %), newspapers (12 %), school/work place (11 %), the story (22 %).
- Based on the data analysis we found that only 25 % of respondents are aware that this is the law and they can propose an initiative on the location of municipal waste disposal and regulation of the municipality Voždovac. Completed rehabilitation of the existing square with a fountain and the surrounding associated area, planted with evergreen plants.
- A large number of respondents (87 %) are not satisfied with the public utilities of the on municipality Voždovac. Namely, intensive urbanization of the municipality could be accompanied by appropriate infrastructure, the high costs of construction, operation and maintenance of infrastructure networks and installations.
- Disturbing is the fact that 42 % of respondents answered that it is not known projects with the goal of environmental protection by local governments, and 31.98 % of them not to think about it.
- Most respondents (97 %) believe that local governments do not participate enough in promoting environmental awareness and the awareness of population about the importance of environmental protection.
- Questionnaire in the survey gives the answer of the respondents to the local government can significantly improve and preserve the environment, namely: the adoption of important laws on environmental protection (34 %), for violations of the same draconian punish (30 %), financial assistance to village in municipality (20 %), adopt important projects in the field of ecology (12 %),

their reasons (to hire more people to care about the cleanliness of the settlement, the introduction of community policing ... is put forward by 2 %) and not think about it 2 % of the respondents.

- The respondents were asked to prioritize the environmental problems in municipality Voždovac and the answers obtained can be analyzed from different aspects. The most common answer (52 %) was hat environmental protection is important, but we have bigger problems (unemployment, low personal income...). Bearing in mind other long-term economic difficulties, this response is absolutely justified. On the other hand, if we sum up all the positive answers (important + the most important) and compare them with all the negative answers (not particularly important + not important) we obtain a satisfactory ratio of 76: 24, which means that for every three citizens who perceive environmental issues as important, there is only one citizen who ignore s these problems (see Nišić et al., 2016).
- Respondents described the state of the environment in the municipality of Vozdovac in the following way: excellent (1 %), satisfactory (13 %), not satisfactory (54 %) and bad (32 %). From the given data it can be explicitly concluded that as many as 76 % of the respondents indicate not an unsatisfactory or poor state of the environment. Our research evidence based on similar research Middleton et al (2011) indicates that "...the surroundings within which humans exist and that are made up of - i) the land, water and atmosphere of the earth; ii) micro-organisms, plant and animal life; iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being" (see Rajović, Bulatović, 2015a, b; Rajović, Bulatović, 2017g).
- The respondents were extremely self-critical and to the question of who are the biggest polluters of the environment in municipality Voždovac, they marked the citizens as the major polluters (44 %). Industry and mining, traditionally perceived as "dirty" polluters, follow with 37 %. With this attitude the citizens of municipality Voždovac refuted the stereotype, which can be attributed to the urban environment in which they live. This indicates a high degree of recognition of personal responsibility. As well and Middleton et al. (2011) we conclude "the state of our environment will determine the level of our prosperity now and for future generations. As we strive to address social equity and economic development in the years to come, our ability to improve the stat of the environment and secure environmental sustainability will shape our future".
- With 39 %, water is marked as the most endangered medium, immediately followed by solid waste with 26 %. It is interesting that respondents are the least concerned about the medium that surrounds them - the air! At this place we are calling for research Middleton et al (2011) and emphasizing "while there are increasing expectations on local government to take custodianship of the environment this is within a municipal climate where funding, skills and capacity are under severe pressure across all areas of municipal functions. The environment has long been a secondary priority in the face of extreme poverty and the need for development and economic growth. Thus the push for local government to achieve greater performance in this sector is countered by many opposing pressures. However, it is important to emphasize that development and economic growth that is achieved at the expense of the environment (i.e. those results is not sustainable and impoverishes future generations by reducing their options and ability to meet their own needs.
- The majority of respondents (63 %) believe that the low level of civic and environmental awareness affects the state of the environment in municipality Voždovac. The respondents were again self-critical and, among others, hold themselves accountable for the actual situation. In the opinion of the respondents, key stakeholders in solving environmental problems are: competent institutions (44 %), all citizens (33 %), followed by companies, potential and actual polluters (18 %), organized groups of citizens and NGOs (7 %) (see Nišić et al, 2016).
- In any environmental action is not took part (71.36 %) subjects in the settlement, although the majority (84 %) wanted to. One such action was in mid 2017 years on the initiative of the Parents Council of the elementary school "Đura Daničić". Namely, a great ecological action was organized for a more beautiful and arranged school yard, which included students, the Eco patrol of the municipality of Voždovac and the local community. The aim of the action is to develop ecological awareness, eco activism and team spirit in children, with the example of a positive practice of jointly regulating green areas. The children were led by their teachers and teachers who had the role of the team coordinator, all activities were adapted to their age, and concrete cleaning

work was done by Eco patrol. It is planned that in the coming period an exhibition of the best and most beautiful eco - messages and artworks will be made by students of this school, inspired by the practical activities that have been carried out today.

"In order to realize the concept of sustainable communities, it is secure future and prevents the devastation of the environment, which produces a risk society, it is necessary to perform a deep transformation and consider the environment as a whole. The most difficult exam that a man taken from its beginning to today, can be successfully overcome and lay solely and only the introduction of quality excellence and sustainable development" (Danelisen et al, 2008).

6. Conclusion

An especially important link in environmental protection is people, with their behavior and relationship to the environment. Environmental awareness depends on many factors, the influence of which is exceptionally complex because of the way they interact with one another and exert joint effects (Smrekar, 2012). The factors that affect environmental consciousness and the human relationship to the environment were dealt with by Holgdate (1979), Špes (1998), Waring and Glendon (1998), Smreker and Breg (2008) are "to study environmental degradation as a factor of urban landscape as well as dealt with seeking an environmentally aware body that could represent a core for expanding the idea of environmental protection as a whole and also its individual features" (Smrekar, 2012).

Survey included of the Municipality Voždovac. A total of 305 interviewed persons of different age and educational level. Our goal was to determine the state of environmental awareness. Surveys have shown the results and interpret the causes of the situation. In conclusion the survey may be implemented in a very high environmental awareness of inhabitants of Municipality Voždovac, according to their own opinion, but out of the question of whether it is an actual picture. This fact leads us to the question of self – criticism surveyed population, and the conclusion of under – informed people about the significance and importance of ecology. At this indicates the fact that even 48 % of respondents classified waste. Surprisingly, the fact that 42 % of respondents answered that it is not known projects with the goal of environmental protection by local governments, and 32 % of them not to think about it. Also, 84 % of respondents stated that the settlement does not exist in sufficient number of separate collection of different types of waste (glass, paper, plastic, cans...). Television is the most powerful medium through which the respondents informed about municipal affairs. It has been shown and that the influence of school and workplace concern. Intense urbanization of villages could be accompanied by appropriate infrastructure, the high costs of construction, operation and maintenance of infrastructure networks and installations. Further, there are also inevitable negative consequences for the environment. Here we speak to one of the Indicators of households especially households in the marginal zone were without access to public water and sewerage. Accordingly, the hygienic conditions of housing in these locations may not be satisfactory. Sewage is the major municipal infrastructure system, but untidy. The sewerage network has unwanted outbursts pumping stations are in dilapidated condition, facilities for waste water does not meet the legislative standards. The majority of respondents 97 % said that local governments do not participate enough in promoting environmental awareness and the awareness of population about the importance of environmental protection. Almost 34 % of respondents provide the answer to the local government can improve the environment by adopting the law, while on the other side of them, 29 % said that took part in the environmental action of the City. On the other hand, if we sum up all the positive answers (important + the most important) and compare them with all the negative answers (not particularly important + not important) we obtain a satisfactory ratio of 76:24, which means that for every three citizens who perceive environmental issues as important, there is only one citizen who ignores these problems. With 39 %, water is marked as the most endangered medium, immediately followed by solid waste with 26 %. It is interesting that respondents are the least concerned about the medium that surrounds them – the air!

Our research records are based on similar research Viler Kovačić (2001) indicates that with economic growth, the use of natural resources also increases, resulting in increased production of larger quantities of waste (see O'Brien, 2007; Larijani, 2010; Haghighatian et al, 2013; Rajović, Bulatović, 2017h). Although waste is an important source of pollution and a threat to all elements of the environment, normative regulations for waste management have long been one of the most

poorly regulated areas of environmental protection in Serbia. The reasons can be sought in the social relationship to waste and the way it is handled. Law on Environmental Protection of Serbia regulates an integral environmental protection system that ensures the realization of the human right to life and development in a healthy environment and a balanced relationship of economic development and the environment in the Republic of Serbia ("Official Gazette of the Republic of Serbia" No. 135/2004, 36/2009, 36/2009 – state law, 72/2009 - state law, 43/2011 - decision of the Constitutional Court and 14/2016). The implementation of this law provided a new approach to solving the problem of environmental protection in general and also the problem of waste management, which is increasingly more pressing itch accession to the European Union, the legislative framework was substantially improved. In any case, this is not sufficient; all stakeholders must be informed, educated, and made aware.

References

Anderson et al., 2010 – *Anderson, B., Wentzel, M., Romani, J., Phillips, H.* (2010). Exploring Environmental Consciousness in South Africa, Population Studies Center Research Report 10 – 709, University of Michigan, Institute for Social Research.

Ando et al., 2007 – *Ando, K. Ohnuma, S., Chang, E.C.* (2007). Comparing normative influences as determinants of environmentally – conscious behavior between the U.S. and Japan, *Asian J. Soc. Psychol.*, 10, 171-178.

Ando et al., 2007 – *Ando, K. Ohnuma, S., Chang, E.C.* (2007). Comparing normative influences as determinants of environmentally – conscious behavior between the U.S. and Japan, *Asian J. Soc. Psychol.*, 10, 171-178.

Bulatović, Rajović, 2011 – *Bulatović, J., Rajović, G.* (2011). Učešće javnosti u koncepciji aktivne zaštite životnne sredine na primeru Banjičke šume, *Zaštita prirode*, 61 (2), 111-128.

Bulatović, Rajović, 2013 – *Bulatović, J., Rajović, G.* (2013). Environmental Awareness for Sustainability: A Pilot Survey in the Belgrade Settlement Brace Jerkovic, *International Journal of Advances in Management and Economics*, 2 (1), 20-27.

Bulatović, Rajović, 2016a – *Bulatović, J., Rajović, G.* (2016). Environmental Awareness for Sustainability Miljakovačke Forest – Pilot Survey in Settlement Miljakovac (Belgrade), *Sochi Journal of Economy,* 39 (1), 4-21.

Bulatović, Rajović, 2016b – *Bulatović,J., Rajović, G.* (2016). Applying Sustainable Tourism Indicators to Community – Based Ecotourism Tourist village Eco – katun Štavna, *European Journal of Economic Studies,* 16 (2), 309-330.

Bulatović, Rajović, 2017a – *Bulatović, J., Rajović, G.* (2017). Some Aspects of the Sport Tourism with the Review of Montenegro: Overview, *Tourism Education Studies and Practice,* 4 (1), 18-28.

Bulatović, Rajović, 2017b – *Bulatović, J., Rajović, G.* (2017). Some Aspects of Eco Tourism with View to Montenegro: Overview, *Journal of Advocacy, Research and Education*, 4 (2), 96-111.

Bulatović, Rajović, 2017c – *Bulatović, J., Rajović, G.* (2017). Some Aspects of Economic-Geographical View on the Sustainable Development of Mineral Resources, *European Geographical Studies*, 4 (1), 4-16.

Clarke, 1993 – *Clarke, J.I.* (1993). Education, population, environment and sustainable development, *International review of education*, 39 (1), 53-61.

Curry et al., 2005 – *Curry, E. T., Reiner, M. D., Figueiredo, A. M., Herzog, J. H.* (2005). A Survey of Public Attitudes towards Energy & Environment in Great Britain, Massachusetts Institute of Technology, Laboratory for Energy and the Environment, Cambridge.

Danelisen et al., 2008 – *Danelisen, D., Aleksić, S., Amidzić, B., Biočanin, R., Rakočević, V.* (2008). Medico-ecological importance of nutrition in the system of quality living environment, *Research and Development*, 28-29, 141-150.

Giuseppe, 2006 – *Giuseppe, I.* (2006). The Power of Survey Design: A User's Guide for Managing Surveys, Interpreting Results, and Influencing Respondents; The International Bank for Reconstruction and Development: Washington, DC, USA, pp. 44-46.

Giuseppe, 2006 – *Giuseppe, I.* (2006). The Power of Survey Design: A User's Guide for Managing Surveys, Interpreting Results, and Influencing Respondents; The International Bank for Reconstruction and Development: Washington, DC, USA, pp. 44-46.

Gotkiewicz, Sternik, 2014 – *Gotkiewicz, W., Sternik, P.* (2014). Environmental Awareness Among the Rural Population in Natura 2000 Areas, with Bartoszyce and Sorkwity Communes as an Example, *Ochrona Srodowiska i Zasobów Naturalnych*, 25 (4), 77-81.

Haghighatian et al., 2013 – *Haghighatian, M., Purafkari, N., Jafarinia, G.* (2013). The impact of Social environmental behaviors on social development: The case of South Pars staff (Assaluyeh), *Journal of Social Development Studies in Iran*, 5 (1), 136-152.

Harju et al., 2014 – *Harju-Autti, P., Kokkinen, E., Novel, A.* (2014). Environmental Awareness Index Measured Cross – Nationally for Fifty Seven Countries, *Univers. J. Environ. Res. Technol.* 4, 178-198.

Harju-Autti et al., 2014 – *Harju–Autti, P., Kokkinen, E., Novel, A.* (2014). Environmental Awareness Index Measured Cross – Nationally for Fifty Seven Countries, *Univers. J. Environ. Res. Technol.* 4, 178-198.

Henson, 1994 – *Henson, P.* (1994). Population growth, environmental awareness, and policy direction, *Population & Environment*, 15 (4), 265-278.

Hiramatsu et al., 2015 – *Hiramatsu, A., Kurisu, K., Hanaki, K.* (2015). Environmental Consciousness in Daily Activities Measured by Negative Prompts, *Sustainability*, 8(1), 24.

Hiramatsu et al., 2015 – *Hiramatsu, A., Kurisu, K., Hanaki, K.* (2015), Environmental Consciousness in Daily Activities Measured by Negative Prompts, *Sustainability*, 8 (1), 24.

Holdgate, 1979 – *Holdgate, M.V.* (1979). A Perspective of Environmental Pollution, Cambridge.

Hull, 1984 – *Hull, Z.* (1984). Swiadomošc Ekologiczna (II), *Aura,* 11, 3-4.

Khajeshahkoohi et al., 2015 – *Khajeshahkoohi, A., Najafikani, A., Vesal, Z.* (2015). en_US & Factors Affecting Environmental Awareness of Rural People (Case Study: Jaghargh Dehestan in Binalud County), *Journal of Research and Rural Planning*, 4 (9), 85-95.

Koković, 2010 – *Koković, D.* (2010). Ecology as a way of life (in Serbian), Svarog, 1, 75-84, Banja Luka.

Kollmuss, Agyeman, 2002 – *Kollmuss, A., Agyeman, J.* (2002). Mind the Gap: Why do people act environmentally and what are the barriers to pro – environmental behavior? *Environ. Educ. Res,* 8, 239-260.

Kollmuss, Agyeman, 2002 – *Kollmuss, A., Agyeman, J.* (2002). Mind the Gap: Why do people act environmentally and what are the barriers to pro – environmental behavior? *Environ. Educ. Res,* 8, 239-260.

Larijani, 2010 – *Larijani, M.* (2010). Assessment of Environmental Awareness among Higher Primary School Teachers, *Journal Human Ecology*, 31 (2), 121-124.

Law on Environmental Protection of Serbia – Law on Environmental Protection of Serbia, Available from: http://www.paragraf.rs (02.11 2017).

LEAP, 2015 – LEAP. (2015). Poll results LEAP, Obrenovac, Available from: http://www.slideshare.net (31.10 2017).

Lekić, Jovanović, 2015 – *Lekić, D., Jovanović, M.* (2015). Report of environmental current state in Republic of Serbia for the year 2014 (in Serbian), Ministry for Agriculture and environmental protection – Environmental protection agency, Belgrade.

Middleton et al., 2011 – *Middleton, J., Goldblatt, M., Jakoet, J., Palmer, I.* (2011). Environmental management and local government, *PDG Occasional Paper*, (1), 1-31.

Morrison, Beer, 2017 – *Morrison, P.S., Beer, B.* (2017). Consumption and Environmental Awareness: Demographics of the European Experience, In *Socioeconomic Environmental Policies and Evaluations in Regional Science* (pp. 81-102), Springer Singapore.

Municiplaty, Voždovac, 2017 – Municiplaty Voždovac (2017). Available from: http://www.wikipedia.org (01.11 2017).

Nišić et al., 2016 – Nišić, D., Knežević, D., Petković, A., Ignjatović, M., Kostadinović, J. (2016). Study of general environmental awareness of the urban population, In *HASSACC – Human And Social Sciences at the Common Conference*, pp. 1-7.

O'Brien, 2007 – *O'Brien, S. R. M.* (2007). Indications of environmental literacy: using a new survey instrument to measure awareness, knowledge, and attitudes of university – aged students, Iowa State University.

Pušić et al., 2012 – *Pušić, Lj., Pajvančić – Cizelj A.* (2012). How do Vojvodina`s citizens perceive environmental issues: depiction of empiric knowledge (in Serbian), Sociology, LIV (1), 153-168.

Rajović, Bulatović, 2015a – *Rajović, G., Bulatović, J.* (2015). Eco Tourism with Special Review on Eco-Village "Štavna", *Scientific Electronic Archives*, 8 (1), 56-65.

Rajović, Bulatović, 2015b – *Rajović, G., Bulatović, J.* (2015). State of environmental awareness in northeastern Montenegro: a review, *International Letters of Natural Sciences*, 2, 43-56.

Rajović, Bulatović, 2017a – *Rajović, G., Bulatović, J.* (2017). Some Aspects of Rural – Urban Interdependence: Economic-Geographical View, *Russian Journal of Agricultural and Socio-Economic Sciences,* 1 (61), 17-28.

Rajović, Bulatović, 2017b – *Rajović, G., Bulatović, J.* (2017). Geographical View of the Fisheries of Montenegro: Overview, *Larhyss Journal*, 29, 167-186.

Rajović, Bulatović, 2017c – *Rajović,G., Bulatović, J.* (2017). Belgrade settlement Braće Jerkovic: Environmental Awareness of the population, LAP LAMBERT Academic Publishing, Düsseldorf, Germany.

Rajović, Bulatović, 2017d – *Rajović,G., Bulatović, J.* (2017). Recreational Fishing: Case Rajova River (Issues Regarding the Development of Recreational Fisheries: Case of the Rajova River), *Scholars' Press*, Saarbrucken, Germany.

Rajović, Bulatović, 2017e – *Rajović, G., Bulatović, J.* (2017). Mobility of Population in Montenegro; Traffic in Northeast Montenegro (CHAPTER I – Internal and External Mobility of the Population of Montenegro in the Second Half of the Twentieth and Beginning of the Twenty First Century with Focus on the Problems in the Research Migration; CHAPTER II – Sustainability traffic in northeastern Montenegro viewed with valorizing accepts the natural conditions with focus on terrain characteristics morphmetric), *Scholars' Press*, Saarbrucken, Germany.

Rajović, Bulatović, 2017f – *Rajović, G., Bulatović, J.* (2017). Some Aspects Sustainable Urban Development: Overview, *Azerbaijanian Journal of Economics and Social Studies*, 3 (2), 52-70.

Rajović, Bulatović, 2017g – *Rajović, G., Bulatović, J.* (2017). Natural Resources, Classification of Natural Potential, Sustainable Development, *World News of Natural Sciences*, 6, 20-35.

Rajović, Bulatović, 2017h – *Rajović, G., Bulatović, J.* (2017). Some Aspects of Economic - Geographical view on the Sustainable Development of Water Resources, *EURASIA: Economics & Business*, 1 (1), 19-29.

Säynäjoki et al., 2014 – *Säynäjoki, E. S., Heinonen, J., Junnila, S.* (2014). The power of urban planning on environmental sustainability: a focus group study in Finland, *Sustainability*, 6 (10), 6622-6643.

Smrekar, 2012 – *Smrekar, A.* (2012). Environmental awareness in Slovenia through residents relationships waste, *Geografski Vestnik,* 84 (1), 129-139.

Smrekar, Breg, 2008 – *Smrekar, A., Breg, M.* (2008). Ankete o divjih odlagališčih odpadkov. Internal material, Geografski inštitut Antona Melika ZRC SAZU, Ljubljana.

Sola, 2014 – *Sola, A.O.* (2014). Environmental education and public awareness, *Journal of Educational and Social Research*, 4 (3), 333.

Špes, 1998 – *Špes, M.* (1998). Degradacija okolja kot dejavnik diferenciacije urbane pokrajine, *Geographica Slovenica*, 30, Ljubljana.

Stern, 2000 – *Stern, P.C.* (2000). New Environmental Theories: Toward a Coherent Theory of Environmentally Significant Behavior, *J. Soc. Issues*, 56, 407-424.

Stern, 2000 – *Stern, P.C.* (2000). New Environmental Theories: Toward a Coherent Theory of Environmentally Significant Behavior, *J. Soc. Issues*, 56, 407-424.

Sumski, 2007 – *Sumski, P.* (2007). Love is life – essay of environmental awareness (in Serbian), Goja, Belgrade.

Viler Kovačič, 2002 – *Viler Kovačič, A.* (2002). Novosti v zakonu o vodah, *Pravna praksa*, 21, 37-38.

Waring, Glendon, 1998 – *Waring, A, Glendon, I.A.* (1998). Managing Risk. Critical Issues for Survival and Success into 21st Century, London, Boston.

Wielewska, Zuzek, 2015 – *Wielewska, I., Zuzek, D. K.* (2015). Environmental Awareness of Rural Population in the Light of the Authors' Research. *Zeszyty Naukowe SGGW w Warszawie. Problemy Rolnictwa Światowego*, 15 (4), 215-222.

Yamada, 2009 – *Yamada, A.* (2009). Environmental Consciousness in Japan: From the "Survey of Attitudes Toward the Environment", NHK Broadcasting Studies, No. 7, Tokyo.

Zarządzanie srodowiskiem, ed. B. Poskrobko., 2007 – Zarządzanie srodowiskiem, ed. B. Poskrobko. (2007). PWN, Warszawa, 61.

Published in Slovak Republic
European Journal of Economic Studies
Has been issued since 2012.
E-ISSN: 2305-6282
2018, 7(1): 16-21

DOI: 10.13187/es.2018.7.16
www.ejournal2.com

Effect of Person's Age on Supplemental Investment Habits Towards Retirement in Federation of Bosnia and Herzegovina

Sanel Halilbegovic [a, *], Enida Mehanovic [a]

[a] International Burch University, Sarajevo, Bosnia and Herzegovina

Abstract

This research will examine the effect of person's age on supplemental investment habits towards retirement in Federation of Bosnia and Herzegovina. Thus, the basic aim of the study is to find out if the age of individuals have an effect on saving and investing habits for retirement. It has been observed that age of person has effect on the supplemental investment habits towards retirement. In this research both primary and secondary data will be used. The primary data for this research was gathered in the form of survey. Data analysis was conducted in SPSS software. Statistical tests were run to see if the age of individuals has effect on saving for retirement. As we found in previous researches that age plays very important role in saving and investing habits, also in this research we came to the conclusion that age of individuals really plays an important role in saving habits of citizens from Federation of Bosnia and Herzegovina.

Keywords: investment habits, retirement plan, pension savings, supplemental investments, person's age.

1. Introduction

A supplemental investment habit is very important factor for shaping the economic well-being of individuals. Individuals need saving for many reasons, but in this study we will just focus on saving to prepare for retirement. It is important to start saving early and to save consistently. So, the more you are able to save during your working career, the greater income will be during your retirement.

In this study the main factor that is wanted to be examined is effect of person's age on supplemental investment habits towards retirement in Federation of Bosnia and Herzegovina.

In following sections basic definitions of keywords will be defined, the reasons how age is affecting supplemental investment habit towards retirement as well as research objectives and hypothesis will be presented and analyzed. The collected data for this study will be presented in methodology section. For the methodology section, one hypothesis will be tested. Data will be analyzed by performing descriptive statistics and inferential statistics. Results of this research will outline key factors of person's age affecting supplemental investment habits towards retirement in Federation of Bosnia and Herzegovina.

2. Literature Review

The main part of a successful lifelong investment strategy is disciplined saving habits, regardless of whether you are saving for retirement, or something else (Pettigrew, 2007). For the

* Corresponding author
E-mail addresses: sanel.halilbegovic@ibu.edu.ba (S. Halilbegovic)

respondents of (Luigina Canova, 2005) saving for retirement is important to guarantee financial situation in the retirement period of life.

Investing is a lifelong process. The best possible way is to start saving for retirement as soon as it is possible, so you will be in better position in the long run. It's best to start saving and investing as soon as you start earning money. The discipline and skills you learn will benefit you for the rest of your life. But no matter how old you are when you start thinking seriously about saving and investing, it's never too late to begin. It's important to start saving early and to save consistently. The more you are able to save during your working career, the greater your income will be during retirement (National Research Council, 2013). In this research we agree with (Cobb-Clark, 2006) that most of individuals may have some kind of difficulties in summing their expectancy about retirement plans.

Hogarth (1991) in his article found that age is significant factor influencing saving for the future. In the article of (Lusardi, 1996) it is stated that the age distribution within one household has effect on the level of saving. As well as (Furnham, 1985) said that age plays very important role in saving habits. His research showed that not all people save in the same way and for the same reason. Most young people save in a bank, the middle age people save through a mortgage, and the older people save through life insurance. Reasons for saving and investing also change through life cycle.

According to (Nick Pettigrew, 2007) research, life stage is one of the most important variables that may have effect on saving behavior. When individuals get older they increased financial responsibilities. These responsibilities stimulate them to start saving as soon as possible, and also to save more consistently. Generally, most young people spend the money that they earned on enjoying the life while they are still young, and they think they would be in better financial position when they get older and start saving until then. This means that young people prioritize spending now over saving for the future.

Many respondents in research report of (Nick Pettigrew, 2007) think they will wait for saving until they have better job and will be more stable in their lives generally. Thus, (Lusardi, 1999) in his research consider that almost one-third of people that are in age from 51-61 yet didn't start to think or save for retirement.

Individuals with age over 50 save more regularly than the individuals around 30 years, and those aged 30 more than younger individuals. Older people save more for retirement whereas younger people save more for house or an apartment (Furnham, 1985).

Hurd (1987) also has the same opinion that elderly seem to accumulate more money as they age even though the life cycle hypothesis implies they should de-cummulate.

Many young people are focused on the present financial planning, but few of them are starting to think when they reach 30s (Nick Pettigrew, 2007). As an outcome, many of them are not thinking about how their retirement would be funded: My opinion settles with his, many young individuals in Federation of Bosnia and Herzegovina are not even thinking about retirement and investing for retirement by their age increases.

Many young workers are unable to save money because many young workers cash inflows are insufficient to support their cash outflows, making it near impossible to set aside money to save. In addition, when young workers are able to find extra cash to save for retirement, many of them have difficulties how to invest these funds (Greco, 2009). Younger individuals also believe that people that are aged from 50 and on are able to save more, because they don't spend money on staffs that younger people spend on. As well as, in the research of (Barbara Griffin, 2013) it is said that older workers are engaged more in retirement planning than younger workers.

Participants in the research of (Nick Pettigrew, 2007) detected some number of barriers towards saving for the retirement. These included the fact that they saw their own retirement as being a long way off, meaning that it was not worth worrying about at this stage in their lives. Most regarded their 30s as a time when they might start thinking about saving for their retirement.

Nick Pettigrew (2007) in his research stated that individuals need higher income to save more for retirement, because they don't want to spend their actual amount of money. If salary was high enough people will be more motivated to save for retirement. Most of them also think that "good" job will bring the amount needed for saving for retirement. The "good" job is the one that brings more income and also it brings stability and longevity in life. Also, as (Cobb-Clark, 2006) wrote in his paper, retirement plans are very closely related to current labor market position.

Hypothesis

Logical hypothesis can be derived from the research title. Key point in this research is to prove or disprove that the supplemental investment habit is effected by the age of person: ***"There is significant relation between age and supplemental investment habits of citizens"*** This actually means that if the relation between age of the person and supplemental investment habits of citizens are significantly related, it means that age of person directly has an effect on supplemental habits of citizens. Validity of the hypothesis in this research will be resolved by the correlation coefficient (*'r'*), as well as with the coefficient of determination *'r²'*. If correlation test proofs that the correlation coefficient and coefficient of determination are close to -1 the hypothesis will "fall", or if it is close to 0 or +1 hypothesis will "stand".

Methodology

The reason why this study has even been initiated is to see the effect of age on supplemental investment habits of citizens in Federation of Bosnia and Herzegovina. The goal of this study is to show that the age of person has an effect on supplemental investment habits. The way of testing the above mentioned hypothesis is in the form of survey. It was conducted mostly through internet (e-mail, Facebook, etc.) and in printed forms. The sampling method that was used is simple random sampling. Online survey was made by Google Forms, an online tool, for easy survey making. The survey was consisted of 13 questions in English and Bosnian language. Analysis will portray dependent variable, which is supplemental investment habits of citizens, and independent variable, which is age of the person, and in the end the inferential data analysis will be done to see the connection between those variables. The relation between age of person and supplemental investment habits will be analyzed by statistical regression and correlation. Statistical regression will focus on the relationship between age of person and the supplemental investment habits of citizens.

3. Results and discussion

Descriptive statistics

Descriptive statistics are numerical and graphical methods used to summarize data and bring forth the underlying information (Gaur, 2009). In this research the age is variable that is observed.

An online survey was conducted to collect data. A total of 230 responded to the online questionnaire. Respondents from 21 to 30 years of age were the majority as 36,09 % ; the second major category were respondents aged from 31 to 40 years as 23,91 %; the third category were the people aged from 41 to 50 years as 19,57 %; fourth category were people aged from 51 to 65 years as 17,83 %, fifth category were people below 20 years as 2,2 %, while last category were people above 65 years as 0,4 %.

The Figure 1 below demonstrates the percentage distribution of the respondents.

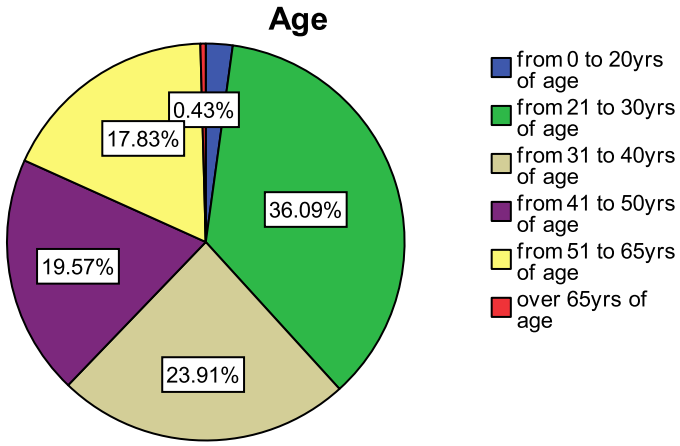

Figure 1: Respondent's age
Source: Author's own calculations.

Table 1. Age distribution of respondents

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	from 0 to 20yrs of age	5	2.2	2.2	2.2
	from 21 to 30yrs of age	83	36.1	36.1	38.3
	from 31 to 40yrs of age	55	23.9	23.9	62.2
	from 41 to 50yrs of age	45	19.6	19.6	81.7
	from 51 to 65yrs of age	41	17.8	17.8	99.6
	over 65yrs of age	1	.4	.4	100.0
	Total	230	100.0	100.0	

Source: Author's own calculations from SPSS

As well, in the Table 1 it is shown that the most respondents were aged from 21 to 30 years. The number of respondents aged under 20 and over 65 years was very low, only six. The reason why there were low respondent rate for those who were aged over 65 might be that the questionnaire was in online form. But, for those under 20 the reason might be low interest in such research. Respondents aged from 21 to 65 years are in total 224.

Correlation test

Correlation is a measure of relationship between two variables. The correlation coefficient gives a mathematical value for measuring the strength of the linear relationship between two variables. It can take values from -1 to 1, +1 is representing significantly positive linear relationship, 0 representing no linear relationship and -1 representing significantly negative relationship (Gaur, 2009). In this analysis bivariate correlation will be tested. Bivariate correlation tests the strength of the relationship between two variables without giving any consideration to the interference some other variable might cause to the relationship between the two variables being tested.

Table 2. Correlation test

Correlations

		Age	How_often_people_think_about_retirement_fund	Additional_savings_for_retirement	Where_participants_save_additional_money	Amount_of_additional_saved_money
Age	Pearson Correlation	1	.308**	.318**	-.223**	.216**
	Sig. (2-tailed)		.000	.000	.004	.007
	N	230	230	230	167	153
How_often_people_think_about_retirement_fund	Pearson Correlation	.308**	1	.307**	-.161*	.011
	Sig. (2-tailed)	.000		.000	.037	.893
	N	230	230	230	167	153
Additional_savings_for_retirement	Pearson Correlation	.318**	.307**	1	-.569**	.439**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	230	230	230	167	153

Where_participants_save_additional_money	Pearson Correlation	-.223**	-.161*	-.569**	1	-.354**
	Sig. (2-tailed)	.004	.037	.000		.000
	N	167	167	167	167	149
Amount_of_additional_saved_money	Pearson Correlation	.216**	.011	.439**	-.354**	1
	Sig. (2-tailed)	.007	.893	.000	.000	
	N	153	153	153	149	153

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
Source: Author's own calculations from SPSS

In every correlation matrix cell, the Pearson's correlation coefficient is derived, as well, *p*-value for two-tailed test of significance, and the sample size. From the Table 2 we will just follow the relation between age and four other variables (how often people think about retirement fund, additional savings for retirement, where people save additional money and amount off additionally saved money). So, from the matrix output we can see that the correlation coefficient between age and how often people think about retirement fund is 0.308 and the *p*-value for two-tailed test of significance is less than 0.0001. Thus, from these numbers we can conclude that there is a strong positive correlation between age and how often people think about retirement fund. Furthermore, correlation coefficient between age and additional savings for retirement is 0.318 and the p value< 0.0001. Thus, they are also highly positively correlated. Third relation we wanted to test was between age and where participants save their additional money. Correlation coefficient between these two is – 0.223 and the p value < 0.005 at 5 % significance level. We can conclude that between age and where participants save their additional money is strong negative correlation. Finally, as fourth relation we wanted to see if age has an effect on participants amount of additional saved money. So, we see from the matrix that they are positively correlated because correlation coefficient is 0.216 and the p value is 0.007.

Regression analysis

A regression analysis is done to see how the values of one variable are related to another variable and make it able to predict the value of one variable based on another variable. In this analysis simple regresion will be tested in order to examine the relationship between additional savings for retirement with the age. Simple regression is analysis where ***dependent variable*** is based on value of ***one independent variable***.

Table 3. Regression analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.912	.084		10.914	.000
	Age	.126	.025	.318	5.069	.000

a. Dependent Variable: Additional_savings_for_retirement
Source: Author's own calculations from SPSS

From the Table 3 we can see that p –value for beta coefficient of age is 0,000 (shown in the Sig column). This value is significant at 5 significant level, since it is less than 5 %. Thus, we cannot accept the null hypothesis which states that there is no significant relationship between age and supplemental investment habits of citizens. Accordingly, we can say-so that the age of citizens is positively related to the supplemental investment habits of citizens in Federation of Bosnia and Herzegovina.

4. Conclusion

The conclusion that was derived from above research and analysis is that the hypothesis"*...There is significant relation between age and supplemental investment habits of citizens ...*" stands, as the statistical tools have shown that the relationship between age and supplemental investment habits of citizens is positively related. The findings of this paper are similar with the previous literature. As (Furnham, 1985) said that age plays very important role in saving habits, also in this research we came to the conclusion which states: age of individuals plays very important role in saving habits of the citizens from Federation of Bosnia and Herzegovina. This conclusion was gathered from the regression analysis.

One of the limitations of this research can be the online survey which lacks the presence of the interviewer to help out. This situation raises the risk for less reliable data. Since the responses were anonymous, some of the surveys might have been filled out just for the sake of completing the request and not with the intentions to contribute to the research itself. This limitation can serve as an example for the students that will graduate nearly, as well for the master and PhD student who could expand this topic deeper.

References

Barbara Griffin, 2013 – *Barbara Griffin, V.L.* (2013). Age, Gender, and the Retirement Process. In M. Wang. The Oxford Handbook of Retirement. New York: Oxford University Press, pp. 202-214.

Cobb-Clark, 2006 – *Cobb-Clark, D.A.* (2006). The Retirement Expectations of Middle-Aged Individuals. IZA Discussion Paper No. 2449.

Furnham, 1985 – *Furnham, A.* (1985). Why do people save? Attitudes to and habits of saving money in Britain. *Journal of Applied Social Psychology*, 5(5), 354-373.

Gaur, 2009 – *Gaur, A.S.* (2009). Statistical Methods for Practice and Research. California: SAGE Publications Inc.

Greco, 2009 – *Greco, J.* (2009). How Do Young Workers Prepare for Retirement? Honors Projects in Economics, 8.

Hogarth, 1991 – *Hogarth, J.* (1991). Asset management and retired households: Savers, dissavers, and alternators. Financial Counseling and Planning, pp. 97-121.

Hurd, 1987 – *Hurd, M.D.* (1987). Savings of the Elderly and Desired Bequests. JSTOR, pp. 298-312.

Luigina Canova, 2005 – *Luigina Canova, A.M.* (2005). The hierarchical structure of saving motives. *Journal of Economic Psychology*, 21–34.

Lusardi, 1999 – *Lusardi, A.* (1999). Information, expectations, and savings for retirement. In H.J. Aaron, Behavioral dimensions of retirement economics.Washington: Brookings Institutions Press, pp. 81, 115.

Lusardi, 1996 – *Lusardi, M.B.* (1996). Household Saving: Micro Theories and Micro Facts. Journal of Economic Literature, 1797-1855.

National Research Council, & C., 2013 – National Research Council, & C. (2013). Aging and the macroeconomy: long-term implications of an older population. National Academies Press.

Nick Pettigrew, 2007 – *Nick Pettigrew, J.T.* (2007). Live now, save later? Young people, saving and pensions. Department for Work and Pensions.

Published in Slovak Republic
European Journal of Economic Studies
Has been issued since 2012.
E-ISSN: 2305-6282
2018, 7(1): 22-41

DOI: 10.13187/es.2018.7.22
www.ejournal2.com

The Effect of Five Key Variables on Cigarette Consumption in the Eight Most Developed Countries

I. Rigas [a], G. Theodossiou [b, *], G. Rigas [b], A. Goulas [c]

[a] J.P. Morgan Chase Bank, Investor Services Department, London, UK
[b] Technological Educational Institution of Thessaly (TEI), Larissa, Greece
[c] University of Thessaly, Greece

Abstract

The objective of this work is to investigate the effect of two quantitative (price (taxes included) of cigarettes per pack and personal income) and of three socioeconomic variables (education level, percentage of the population aged 15-24 and unemployment rate) on the quantity of cigarette consumption per capita per year for each of the eight countries: China, India, Japan, Russia, Brazil, USA, Germany and UK. Three different econometric methods were used, namely pooled cross-section time series, fixed and random effects to estimate cigarette consumption at the country level. The three models showed that cigarettes are a normal good (a necessity) and that an increase in income will cause an increase in cigarettes sales per individual age 15 and over. Moreover, the pooled OLS with cross-section specific coefficients model indicated that China, Japan, Russia, USA and Germany present negative cigarette price elasticity, Brazil presents positive price elasticity, while India and UK present price elasticity not significantly different from zero. The results of pooled OLS model for the three socioeconomic variables showed that their coefficient estimates are slightly negative and significantly different from zero. Once country-level unobserved heterogeneity was taken into account the models indicated, that countries with more university graduates have slightly lower cigarette sales per adult, while the other two socioeconomic variables were found to be statistically not significant.

Keywords: cigarette consumption per capita, price of cigarettes per pack, personal income, education level, unemployment rate, pooled OLS.

1. Introduction

The effect of several quantitative and socioeconomic variables on cigarette consumption has been widely studied. A part of studies use aggregated data to estimate the price and income elasticities of cigarette consumption, while others use and a number of socioeconomic variables as also micro data to evaluate the cigarette demand, in order to contribute to the development of specific tobacco control programs. Studies using aggregated data to evaluate cigarette consumption in different countries around the world are limited.

The price of cigarettes in low-income per capita countries is relatively lower compared with prices in many other countries (Guindon et al., 2002 and Tsai et al., 2002). In September 2002, the average price of a pack of cigarettes in the Australia, USA, and Japan ranged between US $ 2 and

* Corresponding author
E-mail addresses: georgheo@teilar.gr (G. Theodossiou), ioannis.rigas@windowslive.com (I. Rigas) g.rigas@teilar.gr (G. Rigas), goulasap@yahoo.com (A. Goulas)

US $ 4 and in the UK, it was US $ 6.93 (Lee, 2008). However, in China and India it was US$ 1.01 and US $ 1.01, respectively. Consequently, cigarettes in low-income countries cost almost the 15 % of the average price per pack in the UK. The price of cigarettes was 6.9 times higher in the UK and 4.0 times higher in the USA than in Brazil (Lee, 2008). A comparison between income levels and cigarette makes the difference even more remarkable.

In low-income countries, the low cigarette prices of in low-income countries prevent the population to reduce the smoking significantly. Many studies have shown that cigarette taxes can reduce cigarette consumption (Hu, Mao, 2002). The Government of many countries has started using them as one of its most important tobacco control tools (Chaloupka et al. 2000 and Hopkins et al., 2001).

Lee J.M. (2008) found that the ability of tax-induced cigarette price increases to reduce consumption in southern Asia countries mainly depends on the price elasticity of cigarettes. The price elasticity of cigarettes in high-income countries is generally in the range of −0.25 to −0.5, while in low-income countries it is in the range of −0.5 to −0.7 (Lee, 2007). That means that low-income countries can maximize its tobacco control results with a high cigarette tax policy.

Gallus S. et al. (2006) found that, on average, in Europe cigarettes consumption decreases 5–7 % for a 10 % increase in the real price. That strongly supports an inverse association between price and cigarette smoking. Lee J. M. et al. (2009) have confirmed in Taiwan that low-income, poorly-educated smokers are most likely to purchase smuggled cigarettes when faced with the rising costs of legal cigarettes.

Iglesiasa R. et al. (2007) studied the smoking situation in Brazil, and the importance of the tobacco control program in reducing smoking in the country. Available evidence indicates that there was a significant drop in smoking in Brazil and total cigarette consumption per adult since the early 1990s. However, smoking is observed among the less cultured classes of the population, which are usually the poorest. The tobacco control program in Brazil is considered very innovative, but it has mainly focused on non-price instruments.

Fagan P. et al. (2007) and Moolchan et al. (2007) have argued that health disparities by tobacco use are created, because it is mostly concentrated among those with low income, those with less education than a college degree and among whites and American Indians. Education above the high school level is associated with less smoking, lower cigarette consumption, and increased likelihood of quitting smoking (Fagan et al., 2007). Higher income is associated with smallest reduction in smoking and lower consumption among current smokers (Tauras, 2006). Blue collar and service workers present bigger probability to smoke than white collar workers (Townsend et al., 1994).

The phenomenon of cigarettes demand and of cigarettes supply was studied by Chaloupka and Warner (2000) as also from Gallet and List (2003) for the U.S. cigarettes market. This has helped governments to impose taxes on cigarettes, which serve both to reduce smoking and to increase tax revenue to fund tobacco control programs (Pieper, 2006). Farrely et al. (2003) have studied separately tax effect and price effect, but in separate models than as two parts of the same model. Baltagi and Goel (1987) have investigated the effect of taxes separately from price. The majority of studies have concentrated on price elasticity rather than tax elasticity. The estimation of price elasticity, which embodies and the tax elasticity, will be one of the objectives of this study.

The 10th World Conference on Tobacco or Health (1998), settled in Beijing, was a landmark in the history of tobacco control as it was unanimously agreed that it is impossible to be enforced one kind of policy in order to reduce the tobacco consumption. Each country has its own characteristics with result the weight of each factor to differ widely. In the Conference, representatives of all countries took part in order to suggest, compare and contrast their proposals.

According to the findings of the 10th World Conference on Tobacco or Health (1998). Research on tobacco control should be more caution and to a greater extent than in the past. Country-specific evidence must be completed detailed and focus on the determinants of tobacco use. Several gaps could be filled quickly and provide the necessary information that could accelerate the development of policy. Five examples are given:

- First, data on children should be collected and the implications of applied policies to be evaluated.

- Second, it will be investigated on how to maintain the presently low-smoking rates among women.
- Third, it should be evaluated the relationship between successful quitting by adults and the initiation of smoking by their children.
- Fourth, it should be assessed the role of litigation and its connection to countries at various stages of development
- Fifth, policy analyses should be conducted to the identification of successful tobacco tax policies to support research initiatives, tobacco control initiatives and to constitute a successful example for other countries.

2. Literature Review

Smoking constitutes for a lot of decades the main cause of death and illnesses in the world. Various tobacco control programs have been placed in application in most countries for big time interval without they have brought the desirable results. Many studies were worked out in different countries which have examined the use of tobacco and moreover have analyzed the impact of various factors on total tobacco consumption. They showed that the larger part of these studies have examined price elasticity than tax elasticity with alone exception the work of Baltagi V. and Goel R. (1987), that studied the effect of prices separately from the effect of taxes. Farrely et al. (2003), as is mentioned above, have studied separately tax effect and price effect, but in separate models rather than as two parts of the same model. Pieper D. (2008) report that Control programs in the U.S.A are often funded by cigarette taxes and constitutes an important policy tool for tobacco control.

Various methodologies have been used to estimate cigarettes price elasticity. A part of them using data on individuals and others is using aggregate consumption data. Various studies using aggregate U.S. data have estimated that the price elasticity range from -0.14 to -1.12, with a mean of -0.40; more than half of the studies report an estimation in the range of - 0.30 to -0.50 (Pieper, 2008). Goel R. and Nelson M. (2006) report that cigarette consumption is becoming more price inelastic over time. Chaloupka F. and Warner K. (2000) cite evidence that a lot of studies in USA estimated price elasticity to be around -0.40. Gallet and List (2003) found many studies (86) that estimate the cigarettes price elasticity in USA and found a mean of – 0.48 with a standard deviation of 0.43. In the same studies the mean of income elasticity was found +0.42 with a standard deviation of 0.49.

Lee J.M. (2008) cite evidence that the cigarettes price elasticity in low-income countries is generally in the range of −0.5 to −0.7 while it is in the range of −0.25 to −0.5 in high-income countries. Lee J.M. (2008) used the estimates of cigarette price elasticity to assess the possible effects of a large increase in cigarette tax on cigarette consumption in Taiwan. Moreover, he investigated the responses to the cigarette tax increase among smokers with different smoking characteristics and from different socio-economic backgrounds (Lee, 2008). A price elasticity of −0.29 was estimated in connection with a 44 % increase in the cigarettes price. This means that such an event will have relatively little response to smokers (Lee, 2007).

Estimation results yielded a cigarette price elasticity of −0.29 in connection with a 44 % increase in the price of cigarettes. This suggests that smokers will have relatively little response to such an event. In contrary, low-income smokers, smokers who regularly purchase low-price cigarettes, moderately addicted smokers and women showed significant response to the cigarettes price increase.

Hu. T.W. et al. (2010) used estimates of cigarettes price elasticities, data and epidemiology to estimate the impact of a tobacco tax increase on government tax revenue, cigarette consumption, employment and revenue loss in the cigarette industry and tobacco farming and lives saved. Their results showed that, if the recent Chinese tax adjustment passed to the retail cigarettes price, would reduce the number of smokers by 630,000 saving 210,000 lives, at a price elasticity of −0.15.

Lance P. et al. (2004) investigated cigarette consumption in China and Russia using micro-level household data and community surveys. Developing-countries cigarette price elasticity estimates of around −0.75 have relied on aggregate data. In contrast, the micro-level cigarette price elasticity estimates in Russia and China range from 0 to −0.15. This means that raising cigarette prices in developing-countries may not reduce smoking to the degree as previously was suggested.

Gallus S. et al. (2006) examined the variation in cigarette demand according to price across the Europe. The estimated price elasticities for cigarette consumption were −0.74 (95 % CI −1.13 to −0.35) and −0.46 (95 % confidence interval (CI) −0.74 to −0.17) for foreign and local brand, respectively. The inverse relation between price and cigarette consumption was weaker in countries in the European Union (price elasticity for foreign brand of −0.4) as compared to not in the European Union countries (price elasticity of −0.8) (Gallus et al., 2006). The result that in Europe cigarette consumption, on average, decreases 5–7 for a 10 % increase in the real cigarette price strongly supports an inverse relationship between price and cigarette smoking (Gallus et al., 2006).

Iglesiasa R. et al. (2007) studied the smoking situation in Brazil, and the role of the tobacco control program in curbing smoking in the country. Available evidence indicates that there was a significant smoking decline and total cigarette consumption per adult since the early 1990s. Iglesiasa R. et al. (2007) report that smoking is observed more among the uneducated categories of the population, which usually are the may also poorer. The tobacco control program in Brazil is considered very innovative, but it has mainly focused on non-price instruments. Price instruments may be used far more effectively, to build on the substantial program that has been implemented based on non-price instruments

In their British and US studies Graham H. et al. (2006) found that in smokers age 20 and over, smoking related disparities arise from quitting patterns, since so few people start smoking after that age. Native Americans/Alaska Natives and whites (especially white males) have the highest prevalence and Intensity of smoking and earliest age of initiation (LaVeist et al., 2007 and Tauras, 2006), while Asians and Latinos have the lowest smoking trend and intensity (Trinidad, 2004). Fagan P. et al., (2007) refer that Blacks present lower smoking trend than whites and that Latinos, Blacks and Asians have lower smoking intensity than whites and Native Americans.

Thomas S. et al. (2008) report that the recent tobacco control literature suggests that workplace smoke free policies do not have differential effects by education, income and ethnicity. Thomas S. et al. (2008) as also Townsend J. et al. (1994) have found increased sensitivity of cigarette prices smoking status and cigarette consumption among the poor. Kandel D.B. et al. (2004) found also increased sensitivity of cigarette prices and cigarette consumption among blacks and Latinos, although Thomas S. et al. (2008) found no evidence of differential effects of smoking in adults by ethnicity. Franks P. et al. (2007) found that cigarette price elasticity did not depend on socioeconomic status. Regidor E. et al. (2007) suggest that smoking and cigarette consumption may be insensitive to price and Thomas S. et al., (2008) cite evidence that some studies suggest that individuals with higher education may be more sensitive to the cigarette prices.

Dinno A. and Glantz S. (2009) used US cross sectional survey data and found that cigarette prices and clean indoor air laws are independently related with reductions in smoking. They also argue that established patterns of income, education and ethnic disparity in smoking are almost unaffected by either price or clean indoor air laws in terms of both mean effects and variance. Moreover, they argue that cigarette prices and clean indoor air policies are generally neutral with regard to health disparities.

3. Research hypotheses

In the present study the research hypotheses is to test the effect of the five explanatory variables (price (taxes included) of cigarettes per pack, personal income, education levels (university level), proportion of the population in the 15-to-24 age group and unemployment rate) on the quantity of cigarette consumption per capita per year for each of the eight countries: China, India, Japan, Russia, Brazil, USA, Germany and UK. Namely, to estimate the regression coefficients for each of the eight countries that reflects elasticities of cigarette demand.

The selected five explanatory variables are those that are largely discussed in the 10th World Conference on Tobacco or Health (1998) and some of them have been reviewed by several investigators. The estimated coefficients of the above variables will help police makers to select appropriate policies which will contribute to reduce smoking.

The study employs three different econometric methodologies to analyze the panel data on cigarette demand, namely pooled cross-section time series, fixed effects, and random effects, to estimate cigarette consumption at the country level (cigarettes were chosen as they are the most widely common kind of tobacco and only a small percentage of population chooses to smoke pipes, cigars, snuffs and other tobacco kinds). With other words, we will utilize the most recent panel data

from eight countries (USA, Japan, Germany, UK, China, India, Russia and Brazil,) to analyse cigarette consumption at the country level. These countries played a significant role during the 10th World Conference on Tobacco or Health (1998) and have one or more of the following characteristics: They are among the top tobacco producers, the top tobacco consumers and have crucial global politic power.

The remainder of this paper is organized as follows. Section 4 referred to tobacco Control in the World, section 5 to tobacco control policies and section 6 to tobacco control conditions in the under study countries. Section 7 explains the methodology used in this study and section 8 describes the data used in the analysis. The results are presented and discussed in section 9. Finally, section 10 presents the conclusions from the analysis and identifies possibilities for further tobacco control interventions.

Smoking and Tobacco Control in the World

Smoking is the major cause of premature mortality. It is estimated that each year more than four million deaths occur prematurely due to smoking, and half of those in developed countries (WHO, 1997). Among persistent smokers, about 50 % would eventually killed by their habit, and among them several at a young age. Due to the increasing prevalence of smoking in many developing countries with rapidly growing populations, has calculated that there could be nearly one billion deaths attributable to tobacco during the 21 century, compared to one hundred million that occurred during 20th century.

Smoking is a leading cause of death worldwide. According to Iglesiasa R. et al. (2007) "Until recently, the Epidemic of chronic illness and premature death due to tobacco mainly affected rich countries, but it quickly shifted to the developing world. Smoking was estimated to kill nearly 5 million people annually by 2000. About half of those deaths were in low income countries. About 60 percent of male deaths and 40 percent of female deaths due to tobacco smoke were middle-aged people".

Current trends suggest that the tobacco epidemic will affect mostly poorer developed countries, which are already struggling to improve the living conditions of their populations. About 1.1 billion people currently smoke worldwide. More than 1 billion of them are men and 231 million are women. Approximately 900 million smokers (84 percent of all smokers) live in developing and transitional economy countries, while only about 16 per cent live in developed countries, where cigarette consumption decreased significantly in recent decades. Jha and Chaloupka (1999) refer that "in developing countries, smoking increased since 1970, particularly among the poor and less educated".

In 1995, the average prevalence rate in the adult population of low and middle-income countries was 29 percent. Two thirds of the poor nations for which data are available have male smoking rates above 35 percent, which is the average prevalence rate in the developed world. There are many low and middle-income countries with large pockets of poverty and high smoking rates (Iglesiasa et al., 2007). Esson and Leeder (2004) report that "Over the next 25 years, total cigarette consumption is forecast to grow by 60 percent in countries with medium levels of human development and 100 percent in countries with low human development".

Smoking rates for females in the developing world are much lower than for males, but this is set to change. Data from the Global Youth Tobacco Survey show that many girls in their early teens are taking up smoking in the developing world. Data from many countries show that the poor are most likely to smoke. Regardless of country income, poorer individuals are those more likely to use tobacco, accounting for much of the mortality gap between rich and poor (Iglesiasa et al., 2007).

Tobacco Control Policies

The scientific community has accepted that smoking is a major cause of morbidity and mortality. In most developed countries measures were taken to combat the smoking epidemic. There is no one key intervention to control smoking. The present consensus about tobacco control programs suggests that the most effective measures to reduce demand are: consumer information, bans on tobacco advertising and promotion, warning labels and restrictions on public smoking (non-price measures), higher cigarette taxes and increasing access to smoking cessation programs.

OECD countries have approved major control programs to reduce tobacco consumption, based on several instruments that interact, reinforcing their individual effect. Countries with successful control policies implement several approaches to reduce demand and control illegal tobacco trade or smuggling. Tobacco control programs generally focus on prevention of initiation,

promoting cessation and reducing exposure of non smokers to exposure of non smokers to smoking. The instruments or mechanisms to reduce demand are: tax and price increases, spreading information about health consequences, non-price restrictions on smoking and regulation of tobacco products.

Health information campaigns, smoking bans, restrictions on youth access to tobacco and legislation to restrict smoking in work places has been proved to be quite effective.

Efforts to decrease smoking implemented in varying degrees in different countries and their application and success is variable. The tobacco control community will maintain its efforts to implement evidence-based interventions which are disseminated as widely as possible. Koh H.K. et al. (2007) refer that "new interventions are needed because even with the best and the most powerful application of the existing interventions smoking persists in society. This clearly demonstrates the need for further and better treatments".

Tobacco Control in USA, EU, Japan and BRIC countries

USA

Tobacco remains the leading preventable cause of death and disease in the USA. Fagan et al. (2004) found that "the difference in the health of U.S. citizens is created from tobacco use, and there is greater among those with less education, low income and between whites and American Indians. Education above a high-school degree is associated with lower consumption, lower smoking prevalence, and increased likelihood of quitting among smoker". Blue collar and service workers are more likely to smoke than white collar workers (Barbeau et al., 2004a,b).

Pieper D. (2008) report that "the cigarettes market in the U.S. is characterized by inelastic demand and an enough elastic supply. This has helped state governments to impose taxes on cigarettes, which are not only an important tool for reducing smoking but also create a significant amount of tax revenue on an ongoing basis to fund a series of tobacco control programs".

EU

According to WHO (2003) "In many European countries, smoking is still fashionable and desirable for men and women, although much of the rest of the developed world considers non-destructive to one's health. Even today in many European countries one can smoke in enclosed public places such as schools, hospitals, theatres, buses, taxis, restaurants, etc". Joossens, L. & Raw, M., (2006) released a smoking control scale report, which takes into account the following factors: consumer information, advertising bans and compliance, bans in workplaces and in public facilities, consumer information and awareness, warning labels on products, access to smoking cessation treatment and price increases due to increased "sin taxes". According to this scale, Ireland, United Kingdom, Norway, Iceland and Malta have the best scores respectively. Conversely, Luxemburg, Romania, Latvia, Austria and Spain had the lowest scores respectively. This scale gives approximately an overview of how well a country is controlling cigarette smoking

Japan

Wan J. (2006) cites evidence that "Cigarette consumption and the prevalence of smoking in Japan have been much higher than comparable rates in other developed countries. The provisions of the Japanese anti-smoking policy have been very lax, compared to those of other developed countries. This observation raises the question of whether Japanese anti-smoking policies, and especially tax-prise increases, will actually reduce cigarette consumption".

The prevalence of smoking among Japanese adults and youth has been very high. Japan has been regarded as a 'smokers' heaven,' largely as a result of the lack of tobacco controls and the high prevalence of smoking.

The empirical results of Wan J. (2006, p. 1673) showed that "the short-run and long-run price elasticities range from -0.338 to -0.421, and from -0.679 to -0.686, respectively. Thus, increases in tax revenues in the long run are likely to be smaller than those in the short run. As a result, tax increases would be an effective means of curbing smoking and reducing its social cost".

Russia

Russia counts 40 million smokers and has one of the highest rates of smokers in the world. Smokers are predominantly male. Foreign companies control 70 % of the Russian market after the collapse of communism invested in local production units. The government has not taken significant measures to control smoking, cigarette advertising spread everywhere, and Russia has one of the lowest cigarette tax rates in the world (Lance et al., 2000).

Recently, after Russia's accession to the World Health Organization it proceeded in reception of measures to reduce tobacco use. These measures include: Ban tobacco advertising and promotions, health warnings on tobacco products, Bans on smoking in public places and workplaces, raise the price of tobacco products (increasing tobacco taxes) and fund tobacco prevention and cessation programs. Current health warnings on cigarette packs cover just 5 percent of the package and are often difficult to read (Karsten Lunze et al., 2013)

China

M Lance P. et al. (2004) have argued that "China as Russia constitutes ideal case for the analysis of cigarette demand. Both are big and diverse countries that present almost all economic circumstances that may be encountered in today's developing world. China presents the greatest demand for cigarettes. The Chinese market dominated for decades by the state tobacco company of China National (CNTC), with more than a thousand brands. The consumption of cigarettes increased impressively the last decades, with the female smoking rates to constitute a negligible percentage".

Smoking in China is a serious public health problem. There are more than 300 million smokers and almost 500 million non-smokers, exposed to second hand smoke. So, urgent actions should be taken for tobacco control. Hu T.W. and Mao Z. (2002) report that "the Chinese policy makers have not implemented reliable tobacco-control policies. Sporadic attempts were made by local governments to discourage smoking, but no coordinated effort to raise consciousness and to deter it. Taxes amount in the 35% of the price of cigarettes, constitute one important revenue, with result governing do not discourage the smoking. This percentage is relatively low compared to the other countries".

India

The tobacco problem in India presents a peculiar complexity since it is produced, exported and consumed. Portuguese were first introduced tobacco to India four hundred years ago. Ever since, sixty five per cent of all men and thirty three per cent of all women use tobacco in various forms. Tobacco causes over 20 categories of fatal and disabling diseases including oral cancer. More than 20 categories of fatal and harmful diseases caused by tobacco use in India and it is predicted that up to 2020 that tobacco will constitute 13% of all deaths in the country. Gupta PC. (2006) have argued that a major initiative have to be taken to control the smoking epidemic that has grown rapidly in developing countries.

There are many in India "The tobacco lobby" who argue that tobacco control measures will adversely affect the economy and the employment with the loss of a significant number of jobs. The net impact of tobacco control has not been adequately researched in the Indian economy and is therefore difficult to assess the precise impact of tobacco control measures. Studies from other developing countries have shown that job losses occur in the sectors of industrial and agricultural production. Jacobs R. (2000) states that these losses can be covered by employment growth in all other industries, particularly those of labour-intensive as well as the service industry. Jobs lost in retailing tobacco products are possible to be replaced by jobs in retailing other products that people can purchase with the money formerly spent on tobacco (Jacobs, 2000).

Shimkhada R. & Peabody J. (2003, p. 51) have argued that the future national tobacco control legislation in India will need better understanding of the political economy, as the one of the largest agricultural tobacco producer, slowing this industry down will require careful investigation of the involved stakeholders, as also concerted political will and sustained commitment.

Shimkhada R. & Peabody J. (2003, p. 51) refer that "Tobacco use in various forms India is forecasted to have irreversible damage to human health. The Indian government recently has begun to understand and act on the seriousness of the situation, and to combat this social ill it initiate a legislative process. This legislation to be successful, should be tested and include measures such as: tax increases on tobacco products, bans on advertising and promotion, smoking cessation Interventions, sales and distribution restrictions, intense education of the population and information about health risks of smoking".

Brazil

Smoking is one of the most important risk factors for non communicable diseases (NCD), the main cause of death and disease in Brazil. The proportion of deaths by NCD increased more than

three times in the country between the 1930s and 1990s. In 2004, non communicable diseases (NCD) were responsible for about 63 percent of mortality by known causes.

Brazil has developed tobacco control interventions since 1985. A recent study of non-communicable diseases (NCD) in Brazil found that the cornerstone of Brazil's program is sweeping legislation which started in 1996 by restricting tobacco use in public places.

It includes, for example, bans on smoking in public places (schools, theatres, government offices) and on public transportation, warnings on cigarette packs, bans on advertising, information about health risks of smoking and extensive mass media campaigns. Danel et al. (2005) report that "'Brazil is one of a few countries that regulates tobacco products including warning labels, regulation of tobacco product marketing, bans on advertising and promotion and distribution restrictions. Taxes make up about 74 percent of cigarette prices but they are still relatively low in Brazil, despite fairly high taxes".

Available evidence indicates that there was a significant decline in smoking in Brazil between 1989 and 2006. About two decades ago, the government launched a tobacco control program, with a marked acceleration of efforts since 1990, focusing on non-price interventions such as bans on advertising and promotion, restrictions on smoking in public places, intense education of the population, information about health risks of smoking and other activities. Evidence gathered by the study of Iglesiasa R. (2007) indicates that in Brazil:

- Smoking is significantly decreased between 1989 and 2006. In 2006, about 20 percent of males and 13 percent of females smoked in the main Cities.
- Smoking is more remarkable among the low-educated groups of the population, which probably be the poorer.(4) There is a 1.5-2 fold higher prevalence of smoking among those with little or no education as compared to those with more years of schooling.
- Total cigarette consumption per adult is significantly decreased, but has stabilized in recent years. Legal and illegal sales of cigarettes decreased from 1,700 cigarettes per year in 1990 to 1,175 in 2003-2005.
- The percentage of families with smokers decreased from 34 percent in 1995-96 to 27 percent in 2002-2003(4). The proportion of tobacco expenditures in total household expenditures also decreased from 3 percent in 1995-96 to 2 percent in 2002-03.
- Lung cancer rates during early adult life decreased among males between 1980 and 2004, but increased among females, which may be related to smoking cessation among men, and increased smoking among women.
- From 1996 to 2005, there were over 1 million hospitalizations attributable to smoking. Tobacco-related hospitalizations cost about US$0.5 billion, or 1.6 percent of the hospitalization budget between 1996 and 2005.

Cigarette consumption per capita, even at its pick in the 1980s, was always much lower in Brazil than in OECD countries such as the US, Canada, France, Germany, and Italy. Brazil smoking prevalence rates and cigarette consumption among adults has also been lower than those in several neighbouring countries, which may be the result of domestic tobacco control policies implemented in the 1990s. However, consumption has remained stable in Brazil in recent years.

4. Methodology

The three econometric models

Three different econometric methods were used, namely pooled cross-section time series, fixed and random effects, to estimate cigarette consumption at the country level. There are 104 data points for estimation from eight countries and 13 years (1997-2009). A log model is used to estimate regression coefficients that reflect elasticities of cigarette demand. We followed the same process as Pieper D. (2008, p. 8) for his model. The dependent variable in the regressions is the natural log of the quantity of cigarettes per pack sales per individual age 15 and over per year for each country (*q*). The independent variables are the natural log of the price of cigarettes per pack in cents (p) (taxes included) and the natural log of real per capita personal income in dollars (pi). The socioeconomic variables are not logged, because they are measured in percentage. The three socioeconomic variables which are included in the model are the percentage of university graduates (univ.), the rate of unemployment (unemp.) and the percentage of the population aged 15 to 24 (pop 1524).

All the explanatory variables which are used are the most common and important factors to control tobacco as discussed in the 10th World Conference on Tobacco or Health (1998).

The model for the three econometric methodologies is specified as follows:

Pooled OLS*:

$$logq_{ct} = b_o + b_1 logp_{ct} + b_2 logpi_{ct} + b_3 univ_{ct} + b_4 unemp_{ct} + b_5 pop1524_{ct} + e_{ct}$$

Fixed or Random Effects:

$$logq_{ct} = b_o + b_1 logp_{ct} + b_2 logpi_{ct} + b_3 univ_{ct} + b_4 unemp_{ct} + b_5 pop1524_{ct} + a_c + e_{ct}$$

All variable are measured for each country (c) and each year (t). The unobserved country-specific fixed effects are represented in the fixed effects model with term a_c that do not change over time. The observed explanatory variables are assumed to be correlated with the term a_c. In the random effects model the term a_c represents unobservable country specific effects. These effects are uncorrelated with the independent (explanatory) variables and are randomly distributed. e_{ct} is the term representing random errors (Eviews 5, Pooled Time Series, Cross-Section Data).

According to the 10th World Conference on Tobacco or Health the following variables are the most important for the tobacco control:

The price of cigarettes per pack in cents (p): As there is a lack of data for taxation, the real price of cigarettes per pack is used, which adapt the tobacco tax and each increase or reduce in the price usually implies an amendment in the tobacco taxation. Taxation is the most crucial factor for tobacco control, as the governments can use this measure to protect the population, independently of its educational level, its income, its unemployment etc.

The real per capita personal income of population (pi) plays a significant role for the cigarettes consumption as people who have ensured their basic needs, can consume more money for other activities as for cigarettes.

The percentage of university graduates (univ): The knowledge of the negative effects of smoking are more effective to people of high level education as showed the results of recent researches in the field of health-tobacco.

The unemployment rate: The more unemployed people the bigger cigarette consumption we have. People who have lost any hope to find a job end up harming themselves.

The percentage of population in the age of 15-24 (population aged 15-19 + population aged 20-24): This population age-period is very crucial, because most people start smoking in this period of their life.

There were also thoughts of using variables which will show the rate of corruption in politics, the influence of advertising in the population, the life expectancy etc., but the differences between years were almost the same. For that reason, we decided that it is better to include these factors in the intercept b_o and in the country-specific effects a_c of our model.

The limited numbers of independent variables in the models create country specific effects and if they are ignored, may cause heterogeneity in the model. This can result from the following reasons: tobacco usage may be treated differently by different countries, the tobacco control programs or the laws restricting tobacco usage may be differentiated among the countries, the growth level of the country, the culture of the population, the degree of economic dependence of the country on the tobacco industry (such as India and China), the intervention of WHO etc. (Pieper, 2008: 10).

If the observed independent (explanatory) variables are correlated with the unobserved effects, the OLS estimates will be inconsistent. The appropriate method in this situation is fixed effects estimation (see Eviews 5, Pooled Time Series). In the case that the unobserved effects are random and moreover uncorrelated with the independent (explanatory) variables explanatory variables, the OLS estimates will be inefficient (Eviews 5, Pooled Time Series). The appropriate method in this situation is random effects estimation. In the omission of any time-invariant variables the fixed effect method is robust and produces consistent estimators (Pieper, 2008).

From the other side, if the random effects assumption is correct, the random effects method produces efficient estimators (Pieper, 2008: 10). The application of fixed effects or random effects method to the panel data is more appropriate from the standpoint of econometric theory when is given the unobserved heterogeneity among countries (Pieper, 2008: 10).

* Ordinary Least Squares (OLS) or linear least squares

Moreover, the application of pooled OLS with cross-section specific coefficients methodology is also appropriate and gives a model with better goodness of fit (R^2) and better specification (Akaike info criterion and Schwarz criterion) as the simple pooled OLS.

Expected relationships

According the existing theory, the expected relationships among the dependent variable and the explanatory variables would be as follows: the price elasticity of cigarette demand would expect to be negative and income elasticity may be either negative or positive, depending on whether cigarettes are an inferior or a normal good.

Chaloupka and Warner (2000) have argued that the expected sign of the coefficient on the explanatory variable "percentage of university graduates" would be negative, if smoking is more prevalent among people with less education.

The sign of the coefficient of the explanatory variable "percentage of population aged 15 to 24") would depend on whether the trend for smoking in that age group is upward or downward. The sign of the coefficient of the explanatory variable "unemployment rate" might be positive because of stress created by unemployment, since the stress of unemployment might increase smoking.

Data

Initially there was an attempt to gather annual data for a period over than 30 years for all used variables and for each country. But it was impossible because annual data for all variables were only available from 1997 onwards. Then we tried to find quarterly data on all used variables and for each country. Quarterly data were found only for USA and UK. We also ran the analysis with quarterly data only for these two countries as a robustness check.

Data for this analysis came from the Euromonitor International from national statistics and the International Monetary Fund (IMF), International Financial Statistics. In table 2 are given details for the data sources. The data concern each from the 8 countries for the time period 1997 to 2009. The data of the independent variables "cigarette prices" and "gross income" are converted from nominal to real values using constant 2000 national currencies. The National Consumer Price Index for each country is used to convert nominal values to real values based on 2000 national currencies for all countries. Real values based on 2000 are converted from national currencies to dollars using the rate of Jun 3, 2010.

The dependent variable "Cigarette consumption per individual" is calculated by dividing total cigarette consumption by the population age 15 and over in each country. The independent variables "per capita income", "education level (university level)" and the "percentage of the population aged 15 to 24" are calculated by dividing by the total country population. Unemployment rate is calculated by dividing the unemployed population by the country population aged 15-to-65. In table 3 are given the descriptive statistics for the dependent and the independent variables.

5. Results

The results of the estimation for the pooled OLS, the fixed effects, and the random effects methods are given separately in the columns of Table 4. The standard pooled OLS estimates show a price elasticity of -1.10, significantly different from zero at the 1 % level. This means that the cigarette consumption will fall 11 % by a price increase of 10 %, assuming the other factors (independent variables) remain constant. The estimated income elasticity for the pooled OLS model is +0.96 and is significantly different from zero at the 1 % level. This means that cigarettes are a normal good (something that one needs) and that the quantity of cigarettes sold per individual age 15 and over will be increased to 9.6 % for a 10 % increase in incomes.

The results are inconsistent with estimates from previous studies done for developed and developing countries. This result may be biased and due to the heterogeneity that presents each country and is not accounted for in the pooled OLS model.

The fixed effects and random effects models yield different estimates from the pooled OLS model because do account for the unobserved heterogeneity for each country. The estimated price elasticities from the fixed and random effects models are -0.03 and -0,01, respectively, which are not significantly different from zero at the 10 % level. The estimated income elasticities from the fixed and random effects models are essentially different from this of the pooled OLS model. They are 0,26 and 0,31 for the fixed and random effects models, respectively, and both are significantly

different from zero at the 1 % level. Consequently, when the unobserved heterogeneity is accounting for, cigarettes are presented to be a normal good too. All three models, however, show that countries with higher incomes overall sell more cigarettes per individual age 15 and over (adult for smocking).

The results of pooled OLS model the results showed some interesting things about the three socioeconomic variables. The coefficient estimates for the proportion of university graduates is -0.07, small and negative but statistically significant at the 1 % level. This shows that countries with higher rates of university graduates have slightly lower sales of cigarettes, which confirms previous studies that showed that cigarette consumption declines with increasing education. The pooled OLS model shows that countries with more young adults aged 15-24 have lower cigarette sales per adult, elasticity -0.16, and it is statistically significant at the 1 % level. The coefficient estimates for the unemployment rates is -0.07, statistically significant at the 5 % level, but not economically significant. This indicates that unemployment rate has a small negative effect on cigarette sales, which means that business cycles do not play a key role in determining cigarette sales.

The fixed effects and random effects model, show that when the unobserved heterogeneity of the countries is taken into account the effect of more university graduates in a country remain the same, but the percent of young adults aged 15-24 and the unemployment rate were found to be statistically not significant at the 10 % level.

Better results, according R^2 criterion, Akaike info criterion, Schwarz criterion and Durbin-Watson statistic, are received with application of pooled OLS with cross-section specific coefficients methodology, which are about in line with the estimation results reported in previous studies. Cross-section specific coefficients methodology list variables with different coefficients for each country (member of the pool). EViews determine a different coefficient for each country (cross-sectional unit), and label the output using a combination of the series name and the cross-section identifier (Eviews 5, Pooled Time Series). The country-level heterogeneity (fixed effects or random effects) is at a large percentage accounted for in the pooled OLS with cross-section specific coefficients approach, with the cross-section specific independent variables logp and logpi. The results of the estimation according this approach are reported in Table 5, separately for the country price elasticities and the country income elasticities.

The country price elasticity and the country income elasticity are as follows:

1. China: The price elasticity is -0,88, significantly different from zero at the 1 % level and the income elasticity is 0,39, significantly different from zero at the 1 % level too.

2. India: The price elasticity is -0,30, not significantly different from zero at the 10% level and the income elasticity is -0,40, significantly different from zero at the 1 % level.

3. Japan: The price elasticity is -0,90, significantly different from zero at the 1 % level and the income elasticity is 0,49, significantly different from zero at the 1 % level too.

4. Russia: The price elasticity is -0,50, significantly different from zero at the 1% level and the income elasticity is 0,18, significantly different from zero at the 1 % level too.

5. Brasil: The price elasticity is 0,13, significantly different from zero at the 1 %
Level and the income elasticity is -0,31, significantly different from zero at the 1 % level too.

6. USA: The price elasticity is -0,48, significantly different from zero at the 1 %
Level and the income elasticity is 0,22, significantly different from zero at the 1 % level too.

7. UK: The price elasticity is 0,08, not significantly different from zero at the 10 % level and the income elasticity is -0,15, not significantly different from zero at the 1 % level too.

8. Germany: The price elasticity is -0,94, significantly different from zero at the 1 % level and the income elasticity is 0,48, significantly different from zero at the 1 % level too.

These results indicate that cigarettes are a normal good (a “necessity”) for the countries China, Japan, Russia, USA and Germany. Namely, an increase in income will cause an increase in cigarettes sales per individual age 15 and over. For the countries India and Brazil cigarettes are an inferior good and for UK cigarettes are an inelastic good. The countries China, Japan, Russia, USA and Germany present negative price elasticity, significantly different from zero at the 1 % level. Brazil presents positive price elasticity, significantly different from zero at the 1 % level, while India and UK present price elasticity not significantly different from zero at the 10 % level.

The pooled OLS with cross-section specific coefficients model shows that countries with more university graduates have slightly lower cigarette sales per adult, elasticity -0.034, and this is

statistically significant at the 1 % level. The percent of young adults aged 15-24 and the unemployment rate were found to be statistically not significant at the 10 % level.

The results of the estimation for the pooled OLS and the fixed effects estimation methods, using quarterly data for USA and UK, are given separately in the columns of Table 5. Random effects estimation was impossible, because it requires number of cross- section > number of coefficients (see Eviews 5).The coefficients estimated for the corresponding variables in the model of D. Pieper (2006), using annual data for the fifty states of USA and for the time period 1989 – 2005, are in the brackets. We show that the estimated coefficients for all variables and for both techniques have the same sign and are not very different. Consequently, we could say that it is a robustness check.

The results of the estimation using quarterly data for USA and UK according the pooled OLS with cross-section specific coefficients approach are reported in Table 6, separately for the country price elasticities and the country income elasticities.

6. Conclusion

The first three econometric models, namely pooled cross-section time series, fixed effects and random effects indicated that cigarettes are a normal good (a "necessity") and that an increase in income will cause an increase in cigarettes sales per individual age 15 and over. The pooled OLS with cross-section specific coefficients model indicated that cigarettes are a normal good (a "necessity") for the countries China, Japan, Russia, USA and Germany, an inferior good for the countries India and Brazil and an inelastic (indifferent as for income) good for UK.

The pooled OLS with cross-section specific coefficients model showed that the countries China, Japan, Russia, USA and Germany present negative cigarette price elasticity, significantly different from zero at the 1 % level. This means that a cigarette price increase would cause consumption to fall. Namely, price and tax politic could be used for tobacco control to these countries. Brazil presents positive price elasticity, significantly different from zero at the 1 % level, while India and UK present price elasticity not significantly different from zero at the 10 % level. For the last three countries other intervention for tobacco control should be devised.

The results of pooled OLS model for the three socioeconomic variables education, age and unemployment showed that their coefficient estimates are slightly negative and significantly different from zero at the 5 % level. This indicates that countries with a greater proportion of university graduates, with more young adults aged 15-24 and higher unemployment rate have lower cigarette sales per adult.

The other three econometric models, namely the fixed effects, random effects and the pooled OLS with cross-section specific coefficients showed that once unobserved heterogeneity of countries is taken into account the effect of more university graduates in a country remain about the same. Namely, countries with more university graduates have slightly lower cigarette sales per adult and this is statistically significant at the 1 % level. The percent of young adults aged 15-24 and the unemployment rate were found to be statistically not significant at the 10 % level.

References

Guindon et al., 2002 – *Guindon G.E., Tobin S., Yach D.* (2002). Trends and affordability of cigarette price: ample room for tax increases and related health gains, *Tob Control*, 11, pp. 35-43. URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1747639/

Tsai et al., 2002 – *Tsai Y.W., Chen C.S., Liu T.C., Yang C.I., Chuang C.C., Chen J.I.* (2002). Analysis of cigarette taxation in Taiwan. National Health Research Institutes, Taiwan. pp. 188–205.

Lee, 2008 – Lee J.M. (2008). Effect of a large increase in cigarette tax on cigarette consumption: an empirical analysis of cross-sectional survey data. Public Health. 2008 Oct;122(10):1061-7. Epub 2008 Jul 7. DOI: 10.1016/j.puhe.2007.12.013

Hu, Mao, 2002 – *Hu T.W., Mao Z.* (2002). Effects of cigarette tax on cigarette consumption and the Chinese economy. *Tob Control*, 11: 105-8.

Chaloupka et al., 2000 – *Chaloupka, Frank J., Kenneth E. Warner* (2000). The Economics of Smoking, Chapter 29 in The Handbook of Health Economics, eds. Joseph P. Newhouse and Anthony J. Cuyler. New York: North Holland.

Hopkins et al., 2001 – *Hopkins D.P., Briss P.A., Ricard C.J., Husten C.G., Carande-Kulis V.G., Fielding J.E., Alao M.O., McKenna J.W., Sharp D.J., Harris J.R, Woollery T.A., Harris K.W.* (2001). Task Force on Community Preventive Services. Reviews of evidence regarding interventions to reduce tobacco use and exposure to environmental tobacco smoke. PMID: 11173215 Am J Prev Med. Feb., 20(2 Suppl): 16-66.

Gallus et al., 2006 – *Gallus S, Schiaffino A., La Vecchia C, Townsend J, Fernandez E.* Price and cigarette consumption in Europe. 2006. *Tobacco Control*, 15: 114-119 URL: http://tobacco control.bmj.com/content/15/2/114

Lee et al., 2009 – Lee J. M., Chen S. H., Chen H.F., Jeng H.Y.J. (2009). Price sensitivity and smoking smuggled cigarettes. *European Journal of Public Health*, Volume 19, Issue 1, 1 January 2009, Pages 23–27. URL: https://doi.org/10.1093/eurpub/ckn115

Iglesiasa et al., 2007 – *Iglesiasa R., Jhab P., Pintoc M., Vera Luiza da Costa e Silvad, Joana Godinhoe* (2007). Tobacco Control in Brazil. Paper prepared for the World Bank's Human Development Department, Latin America and the Caribbean Region

Fagan et al., 2007 – *Fagan, P., Moolchan, E.T., Lawrence, D., Fernander, A., Ponder, P.K. (*2007). Identifying health disparities across the tobacco continuum. Addiction, 102(2), 5–29. https://www.ncbi.nlm.nih.gov/pubmed/17850611

Moolchan et al., 2007 – *Moolchan, E.T., Fagan, P., Fernander, A.F., Velicer, W.F., Hayward, M.D., King, G., Clayton, R.R.* (2007). Addressing tobacco-related health disparities. Addiction, 102(2), 30–42. URL: https://www.ncbi.nlm.nih.gov/pubmed/17850612

Tauras, 2006 – *Tauras, J.A.* (2006). Smoke-free air laws, cigarette prices, and adult cigarette demand. *Economic Inquiry*, 44(2), 333–342. URL: http://onlinelibrary.wiley.com/doi/10.1093/ei/cbj028/full?url_ver=Z39.88-2004&rft_val_fmt=info %3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=bookitem&rft.btitle=The%20Economic%20Analysis%20of%20Substance%20Use%20and%20Abuse%3A%20An%20Integration%20of%20Econometric%20and%20Behavioral%20Economic%20Research&rft.atitle=Tobacco%20Taxes%2C%20Smoking%20Restrictions%2C%20and%20Tobacco%20Use&rft.spage=15&rft.epage=30&rft.date=1999&rft.aulast=Ohsfeldt&rft.aufirst=R.%20L.&rfr_id=info%3Asid%2Fwiley.com%3AOnlineLibrary

Townsend et al., 1994 – *Townsend, J., Roderick, P., Cooper, J.* (1994). Cigarette smoking by socioeconomic group, sex, and age: effects of price, income, and health publicity. British Medical Journal, PMCID: PMC2541176 309(6959), 923–927. URL: https://www.ncbi.nlm.nih.gov/pubmed/7950662

Chaloupka, Warner, 2000 – *Chaloupka, F.J., Warner, K.E.* (1999). The economics of smoking. In J. P. Newhouse, & A. J. Cuyler (Eds.), *The handbook of health economics*, pp. 1539–1612. NewYork: Elsevier Science and Technology. DOI: 10.1016/S1574-0064(00)80042-6

Gallet, List, 2003 – *Gallet, Craig A., John A. List.* (2003). Cigarette demand: a meta-analysis of elasticities. *Health Economics*, 12, 821-835. http://onlinelibrary.wiley.com/doi/10.1002/hec.765/abstract

Pieper, 2006 – Pieper David R., Sudip Chattopadhyay (2008). State Level Tobacco Control Programs and the Demand for Cigarettes. Department of Economics San Francisco State University. URL: https://www.semanticscholar.org/paper/State-level-Tobacco-Control-Programs-and-the-Deman-Pieper-Chattopadhyay/6bac9382a074a459b022af57c19bdd14b6475ac1

The 10th World Conference on Tobacco or Health (1998) – The 10th World Conference on Tobacco or Health (1998) URL: http://scholar.google.gr/scholar_url?url=https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1759632/pdf/v007p00072.pdf&hl=el&sa=X&scisig=AAGBfm2hBIHqH2d7w8NVCrfb8HPH8cjpKg&nossl=1&oi=scholarr&ved=0ahUKEwiV8q-1iZrWAhUEthQKHdD4BZcQgAMIJigBMAA

Baltagi, Goel, 1987 – Baltagi, Badi H., Rajeev K. Goel (1987). Quasi Experimental Price Elasticities of Cigarette Demand and the Bootlegging Effect. *American Journal of Agricultural Economics*, Vol. 69, No. 4, pp.750–754. URL: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2500414

Farrely et al., 2003 – Farrelly, M., T. Pechacek, F. Chaloupka (2003). The Impact of Tobacco Control Program Expenditures on Aggregate Cigarette Sales: 1981–2000. *Journal of Health Economics*, 22, 843–859. URL: http://www.sciencedirect.com/science/article/pii/S0167629603000572

Pieper, 2008 – *Pieper David R., Sudip Chattopadhyay* (2008). State-Level Tobacco Control Programs and the Demand for Cigarettes. Department of Economics San Francisco State University.

Goel, Nelson, 2006 – Goel, Rajeev, Michael Nelson (2006). The Effectiveness of Anti-Smoking Legislation: A Review. *Journal of Economic Surveys*, Vol. 20, No.3, 325-255. URL: http://onlinelibrary.wiley.com/doi/10.1111/j.0950-0804.2006.00282.x/full

Hu et al., 2010 – *Hu. T.W., Mao Z., Shi J., Chen W.* (2010). The role of taxation in tobacco control and its potential economic impact in China. *Tobacco Control*, 19: 58-64 URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2921252/

Lance et al., 2004 – *Lance P., Akin J., Dow W. et al.* (2004). Is cigarette smoking in poorer nations highly sensitive to price? Evidence from Russia and China", *J Health Econ*, V 23: 173–89. URL: http://www.sciencedirect.com/science/article/pii/S016762960300105X

Graham et al., 2006 – *Graham, H., Inskip, H.M., Francis, B., Harman, J.* (2006). Pathways of disadvantage and smoking careers: evidence and policy implications. *British Medical Journal,* 60(s2): ii7-ii12. DOI: 10.1136/jech.2005.045583

LaVeist et al. 2007 – *LaVeist, T. A., Thorpe, R. J., Jr., Mance, G. A., Jackson, J.* (2007). Research report. Overcoming confounding of race with socio-economic status and segregation to explore race disparities in smoking. *Addiction*, 102(s2), 65–70. DOI: 10.1111/j.1360-0443.2007.01956.x

Trinidad, 2004 – *Trinidad, D. R., Gilpin, E. A., Lee, L., Pierce, J. P.* (2004). Do the majority of Asian-American and African-American smokers start as adults? *American Journal of Preventive Medicine*, 26(2), 156–158. DOI: http://dx.doi.org/10.1016/j.amepre.2003.10.008

Thomas et al., 2008 – *Thomas, S., Fayter, D., Misso, K., Ogilvie, D., Petticrew, M., Sowden, A. et al.* (2008). Population tobacco control interventions and their effects on social inequalities in smoking: systematic review. *Tobacco Control*, 17(4), 230–237. DOI: 10.1136/tc.2007.023911

Kandel et al., 2004 – *Kandel, D.B., Kiros, G.E., Schaffran, C., Hu, M.C.* (2004). Racial/ethnic differences in cigarette smoking initiation and progression to daily smoking: a multilevel analysis. *American Journal of Public Health*, PMCID: PMC1449838 94(1), 128–135. URL: https://www.ncbi.nlm.nih.gov/pubmed/14713710

Franks et al., 2007 – *Franks, P., Jerant, A. F., Leigh, J. P., Lee, D., Chiem, A., Lewis, I. et al.* (2007). Cigarette prices, smoking, and the poor: implications of recent trends. *American Journal of Public Health*, 97(10), 1873. DOI: 10.2105/AJPH.2006.090134

Regidor et al., 2007 – *Regidor, E., Pascual, C., Gutie´rrez-Fisac, J. L.* (2007). Increasing the price of tobacco: economically regressive today and probably ineffective tomorrow. European Journal of Cancer Prevention, 16(4) : 380–384. DOI: 10.1097/01.cej.0000228403.60729.76

Dinno, Glantz, 2009 – *Dinno Alexis, Glantz Stanton* (2009). Tobacco control policies are egalitarian: A vulnerabilities perspective on clean indoor air laws, cigarette prices, and tobacco use disparities. *Social Science & Medicine*, 68: 1439–1447. DOI: 10.1016/j.socscimed.2009.02.003

WHO, 1997 – The world health report 1997 – conquering suffering, enriching humanity http://www.who.int/whr/1997/en/

Jha, Chaloupka, 1999 – *Jha, P., Chaloupka F.J.* (1999). Curbing the Epidemic: Governments and the Economics of Tobacco Control. Washington, DC: World Bank. http://dx.doi.org/10.1136/tc.8.2.196 Tobacco Control 1999; 8:196–20 http://tobaccocontrol.bmj.com/content/8/2/196

Esson, Leeder, 2004 – *Esson K.M., Leeder S.R.* (2004). The Millennium Development Goals and Tobacco Control: An Opportunity for Global Partnership. Geneva: WHO. The millennium development goals and tobacco control – World Health.

Koh et al., 2007 – *Koh H.K, Joossens L.X.* (2007). 43 Connolly GN. Making smoking history worldwide. *N Engl J Med,* 356: 1496-1498. April 12, 2007. DOI: 10.1056/NEJMp068279 URL: http://www.nejm.org/doi/full/10.1056/NEJMp068279

Fagan et al., 2004 – *Fagan, P., King, G., Lawrence, D., Petrucci, S.A., Robinson, R.G., Banks, D. et al.* (2004). Eliminating tobacco-related health disparities: directions for future research. *American Journal of Public Health*, Am J Public Health. 2004 94(2), 211–217. URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1448230/

WHO, 2003 – World Health Organization (WHO) 2003. URL: http://www.who.int/uv/publications/en/sunbeds.pdf

Joossens, Raw, 2006 – *Joossens L., Raw M.* The Tobacco Control Scale: a new scale to measure country activity Tob Control. 2006 Jun; 15(3): 247–253. DOI: 10.1136/tc.2005.015347 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2564668/

Wan, 2006 – Wan J. (2006). Cigarette tax revenues and tobacco control in Japan. *Applied Economics*, 38, Issue 14 1663–1675. DOI: http://dx.doi.org/10.1080/00036840500426900

Karsten Lunze et al., 2013 – Karsten Lunze and Luigi Migliorini Tobacco control in the Russian Federation – a policy analysis BMC Public Health. 2013; DOI: 10.1186/1471-2458-13-64 PMC3732080.

Hu, Mao, 2002 – *Hu TW, Mao Z, Liu Y, de Beyer J, Ong M.* Smoking, standard of living, and poverty in China. *Tob Control.* 14: 247-50. DOI: 10.1136/tc.2004.010777

Gupta, 2006 – Gupta P. (2006). Tobacco control in India. Indian *J Med Res* 123, May 2006, pp. 579-582. Tobacco control in India – ICMR.

Jacobs, 2000 – *Jacobs, R.* (2000). Human resource development and the emergence of workforce development. In W. Ruona and G. Roth (eds.), *Philosophy of Human Resource Development*. San Francisco: Berrett-Koehler, 65-70. http://journals.sagepub.com/doi/abs/10.1177/152342230000200310

Shimkhada, Peabody, 2003 – *Shimkhada R., Peabody J.* (2003). Tobacco control in India. Bull World Health Organ vol.81 no.1 Genebra. http://www.scielosp.org/scielo.php?script=sci_arttext&pid=S0042-96862003000100010

Danel et al., 2005 – *Danel I, Kurowski C and Saxenian H.* (2005). Brazil – Addressing the Challenge of Non Cummunicable Diseases. Washington DC: The World Bank. Doll R, Peto R 1981. The Causes of Cancer: Quantitative Estimates URL: https://openknowledge.worldbank.org/handle/10986/8334

Eviews 5 – Eviews 5, 2004. Pooled Time Series, Cross-Section Data. Quantitative Micro Software, LLC. URL: http://www.eviews.com/help/helpintro.html#page/content/pool-Pooled_Time_Series,_Cross-Section_Data.html

Euromonitor International – Euromonitor International. URL: http://www.euromonitor.com/ [access: 5-7-2010]

International Monetary Fund (IMF) – International Monetary Fund (IMF), http://www.imf.org/en/data [access: 5-7-2010]

International Financial Statistics – International Financial Statistics. http://data.imf.org/?sk=388DFA60-1D26-4ADE-B505-A05A558D9A42 [access: 5-7-2010].

Appendix

Table 1. Data Sources - Expected Relationships

Variable	Description	Expected relationship with dependent variable	Source
Cigarette Quantity (*q*)	Cigarette Retail Sales in millions of sticks		Euromonitor International from national statistics
Price (*p*)	Cigarettes - Retail Value in millions of national currency	Negative	Euromonitor International from national statistics
Personal Income (*pi*)	Annual Gross Income in millions of national currency	Unknown	Euromonitor International from national statistics

Per cent university graduates (*univ.*)	Population by Higher Educational Attainment in thousands	Negative	National statistical offices/Euromonitor International
Unemploy-ment rate (*unemp*)	Unemployed Population in thousands	Positive	International Labour Organisation/Euromonitor International
Per cent of population age 15-24 (*pop1524*)	Population Aged 15-24 in thousands	Unknown	Euromonitor International from national statistics/UN

Table 2. Descriptive Statistics of dependent and independent variables

Variable	Country	Observa-tions	Mean	Std. Dev.	Min	Max
Cigarette packs sold per adult per year	CHINA	13	89.60	5.23	85.02	100.66
	INDIA	13	6.84	0.79	5.74	8.44
	JAPAN	13	135.73	16.29	108.21	155.17
	RUSSIA	13	143.72	17.2	115.26	167.98
	BRASIL	13	36.07	4.11	31.28	44.32
	USA	13	88.82	12.99	69.35	113.14
	UK	13	56.22	7.77	45.47	72.76
	GERMANY	13	85.02	18.37	59.05	103.95
	Total	104	80.25	45.34	5.74	167.98
Price per pack (2000 cents)	CHINA	13	0.75	0.07	0.68	0.90
	INDIA	13	0.53	0.04	0.45	0.57
	JAPAN	13	3.08	0.20	2.83	3.33
	RUSSIA	13	0.29	0.06	0.24	0.43
	BRASIL	13	1.69	0.79	0.98	3.04
	USA	13	3.23	0.51	2.17	4.06
	UK	13	5.73	0.23	5.48	6.22
	GERMANY	13	4.03	0.72	3.28	5.09
	Total	104	2.42	1.86	0.24	6.22
Income per Capita (2000 dollars)	CHINA	13	1,084	440	615	1,866
	INDIA	13	447	71	347	554
	JAPAN	13	37,699	846	36,488	39,545
	RUSSIA	13	1,476	503	817	2,308
	BRASIL	13	3,308	396	2,778	4,033
	USA	13	33,188	1,527	29,792	34,801
	UK	13	24,345	2,248	20,325	26,896
	GERMANY	13	28,043	629	26,532	28,677
	Total	104	16,199	15,178	347	39,545
Per cent university graduates	CHINA	13	5.23	1.09	4	7
	INDIA	13	3.62	0.51	3	4
	JAPAN	13	24.62	1.98	21	27
	RUSSIA	13	11.77	0.93	10	13
	BRASIL	13	7.85	0.90	6	9
	USA	13	24.23	1.83	21	27
	UK	13	20.69	2.36	18	24
	GERMANY	13	19.31	1.97	16	22
	Total	104	14.66	8.20	3	27
Unemployment rate	CHINA	13	3.15	0.43	2.50	3.60
	INDIA	13	6.18	0.54	5.30	6.80

	JAPAN	13	3.56	0.47	2.60	4.20
	RUSSIA	13	6.22	1.46	4.50	8.90
	BRASIL	13	6.64	0.45	5.60	7.30
	USA	13	4.02	1.01	3.00	7.00
	UK	13	4.28	0.71	3.50	5.9
	GERMANY	13	6.29	0.53	5.50	7.00
	Total	104	5.04	1.54	2.50	8.90
Per cent of population age 15-24	CHINA	13	14.85	0.38	14	15
	INDIA	13	19.00	0.00	19	19
	JAPAN	13	11.77	1.24	10	14
	RUSSIA	13	16.08	0.86	15	17
	BRASIL	13	19.23	0.83	18	20
	USA	13	14.00	0.00	14	14
	UK	13	12.54	0.52	12	13
	GERMANY	13	11.46	0.52	11	12
	Total	104	14.87	2.94	10	20

Table 3. Coefficient estimates for log cigarette packs sold per age 15 and over by country using the three econometric models, namely pooled OLS, fixed effects and random effects

Variable	Pooled OLS	Fixed effects	Random effects
Log price of Cigarettes per pack in cents (*log p*)	-1.10** (0.000)	-0.03 (0.517)	-0.01 (0.788)
Log real per capita Income *(log pi)*	0.96** (0.000)	0.26** (0.000)	0.31** (0.000)
Percent university Graduates (*univ.*)	-0.074** (0.002)	-0.070** (0.000)	-0.070** (0.000)
Unemployment Rate *(unemp)*	-0.094* (0.017)	-0.011 (0.411)	-0.012 (0.344)
Age 15-24 percent (*pop1524*)	-0.161** (0.000)	-0.013 (0.379)	-0.001** (0.955)
b_o = constant	5.33** (0.000)	2.94** (0.000)	2.58** (0.000)
a_c = fixed or random effects		$a_{c\ CHI}$= 0.145 $a_{c\ IND}$=-2.366 $a_{c\ JPN}$= 1.086 $a_{c\ RUS}$= 0.975 $a_{c\ BRA}$=-0.883 $a_{c\ USA}$= 0.642 $a_{c\ UK}$ = 0.057 $a_{c\ GER}$= 0.345	$a_{c\ CHI}$= 0.249 $a_{c\ IND}$=-2.155 $a_{c\ JPN}$= 0.936 $a_{c\ RUS}$= 1.096 $a_{c\ BRA}$=-0.793 $a_{c\ USA}$= 0.526 $a_{c\ UK}$ = -0.069 $a_{c\ GER}$= 0.209
Sample size	104	104	104
R^2	0.6823	0.9919	0.5189

* Statistically significant at the 5% level.
** Statistically significant at the 1% level.

Table 4. Coefficient estimates for log cigarette packs sold per age 15 and over by country using the pooled OLS with cross-section specific coefficients*** methodology for the variables log price (log p) and log real per capita income (log pi)

Variable Pooled OLS	Country	Country variable	Coefficient	Prob
Log price of Cigarettes per pack in cents (*log p*)	CHINA	$logp_{CHI}$	-0.88**	0.0000
	INDIA	$logp_{IND}$	-0.30	0.1929
	JAPAN	$logp_{JPN}$	-0.90**	0.0087
	RUSSIA	$logp_{RUS}$	-0.50**	0.0000
	BRASIL	$logp_{BR}$	0.13**	0.0001
	USA	$logp_{USA}$	-0.48**	0.0000
	UK	$logp_{UK}$	0.08	0.8090
	GERMANY	$logp_{GER}$	-0.94**	0.0000
Log real per capita Income (*log pi*)	CHINA	$logpi_{CHI}$	0.39**	0.0000
	INDIA	$logpi_{IND}$	-0.40**	0.0044
	JAPAN	$logpi_{JPN}$	0.49**	0.0033
	RUSSIA	$logpi_{RUS}$	0.18**	0.0010
	BRASIL	$logpi_{BR}$	-0.31**	0.0000
	USA	$logpi_{USA}$	0.22**	0.0052
	UK	$logpi_{UK}$	-0.15	0.4771
	GERMANY	$logpi_{GER}$	0.48**	0.0000
Percent univerity Graduates (*univer*)			-0.034	0.0000
Unemployment rate (*unemp*)			-0.002	0.8015
Age 15-24 percent (*pop1524*)			-1.081	0.2826
b_0			5.944	0.0000
Sample size	104			
R^2	0.9978			

* Statistically significant at the 5 % level.
** Statistically significant at the 1 % level.
*** List variables with different coefficients for each member of the pool. EViews include a different coefficient for each cross-sectional unit, and label the output using a combination of the cross-section identifier and the series name.

Table 5. Coefficient estimates for log cigarette packs sold per age 15 and over by country (USA and UK) using quarterly data and the two econometric techniques, namely pooled OLS and fixed effects

Variable	**Pooled OLS**	**Fixed effects**	**Random effects*** **
Log price of Cigarettes per pack in cents (*log p*)	-0.79** (0.000) [-0.41]***	-0.26 (0.000) [-0.32]	

Log real per capita Income *(log pi)*	0.27 (0.094) [0.47]	-0.38** (0.002) [-0.57]	
Percent university Graduates (*univ*.)	-0.041** (0.000) [-0.0059]	-0.043** (0.000) [-0.0071]	
Unemployment rate *(unemp*)	-0.029** (0.004) [-0.0045]	-0.006 (0.429) [-0.0071]	
Age 15-24 percent (*pop1524*)	-0.027 (0.454) [-0.039]	0.065** (0.009) [0.016]	
b_o = constant	5.76** (0.000)	7.92** (0.000)	
a_c = fixed or random effects		$a_{c\ USA}$= 0.239 $a_{c\ UK}$ =-0.239	
Sample size	104	104	
R^2	0.9401	0.9741	

* Statistically significant at the 5% level.
** Statistically significant at the 1% level.
*** In the brackets are the coefficients estimated for the corresponding variables in the model of D. Pieper (2006), using annual data.
**** Random effects estimation was impossible, because it requires number of cross-section > number of coefficients.

Table 6. Coefficient estimates for log cigarette packs sold per age 15 and over by country (USA and UK) using quarterly data and the pooled OLS with cross-section specific coefficients*** methodology for the variables log price (log p) and log real per capita income (log pi)

Variable Pooled OLS	Country	Country variable	Coefficient	Prob
Log price of Cigarettes per pack in cents (*log p***)**	USA	$logp_{USA}$	-0.24**	0.0002
	UK	$logp_{UK}$	-0.81**	0.0008
Log real per capita income (*log pi*)	USA	$logpi_{USA}$	-0.69**	0.0005
	UK	$logpi_{UK}$	-0.34**	0.0038

Percent university graduates (*univer*)			-0.035**	0.0000
Unemployment rate (*unemp*)			-0.006	0.3741
Age 15-24 percent (*pop1524*)			-0.045*	0.0760
b_0			10.928	0.0000
Sample size	104			
R^2	0.9756			

* Statistically significant at the 10 % level.
** Statistically significant at the 1 % level.
*** List variables with different coefficients for each member of the pool. EViews include a different coefficient for each cross-sectional unit, and label the output using a combination of the cross-section identifier and the series name.

Published in Slovak Republic
European Journal of Economic Studies
Has been issued since 2012.
E-ISSN: 2305-6282
2018, 7(1): 42-47

DOI: 10.13187/es.2018.7.42
www.ejournal2.com

Subsidiarity management

Viktor Ya. Tsvetkov [a, *]

[a] Research and Design Institute of design information, automation and communication on railway transport, Russian Federation

Abstract

The article describes subsidiarity management. The article compares hierarchical and subsidiarity management. The article introduces the concept of information construction. The article describes information constructions of hierarchical and subsidiarity control. The article introduces a topological scheme of time intervals for hierarchical control. The calculation of hierarchical control cycle time is provided. The calculation of time for the downstream (managerial) and upstream (reporting) information flows is shown. The calculation of subsidiarity control cycle time is provided. Describes the application conditions of hierarchical and subsidiarity management.

Keywords: hierarchical management, subsidiarity management, information flow, control cycle.

1. Introduction

Modern management is focused on information models and information modeling (Kilov, 1994, Goedert, 2008, Halpin, 2010). In the analysis of control technologies, the concept of information construction (Aksakal, 2005, Tsvetkov, 2014) as generalization of information model and control technology is used. Information construction describes both the technology and the model. Information construction allows to effectively analyze the management structure and management characteristics. Application of information construction allows to optimize control and select the necessary technology for a specific situation.

2. Discussion

Fundamentals of the subsidiarity approach. Subsidiarity (from *Latin* subsidiarius – auxiliary) is an organizational and legal principle that requires to solve the issues at the lowest, smallest or most remote level at which their solution is possible and effective (Paterson, 2002, Haugland, 2010). The areas of application of this principle include the theory of state and law, finance, management, cybernetics, computer science, military science. Modern subsidiarity control is based on the use of information management technologies (Karimi, 2001). Subsidiarity control becomes a necessary tool with a large number of subsidiaries, advanced network management and multinational campaigns (Birkinshaw, 2000).

Subsidiarity management (control) is closely connected with information management. Descriptive and technological means are used to carry out information management. The means of description include, in particular: information constructions, information models and information

* Corresponding author
E-mail addresses: cvj2@mail.ru (V.Ya. Tsvetkov)

units (Tajima, 1999, Tsvetkov, 2009, Tsvetkov, 2014). Information construction are conceptual description of control technologies, control object and management information resources. Information models are used to describe processes, situations and objects. Information models are used for qualitative separation of control components in the form of situations and managerial processes scenes. This causes the formation of control models as descriptive (Etgar, 2008) and prescriptive (Weber, 1999). Information units serve as the basis for building information models and information construction.

Hierarchical management. Subsidiarity control needs to be compared and connected to the existing types of organizational control models. As a basic control scheme, centric or hierarchical control models are often used (Bitran, 1993, Aldinucci, 2009), which are based on management from the center to the periphery. Figure 1 shows information construction, including flows and hierarchical control construction.

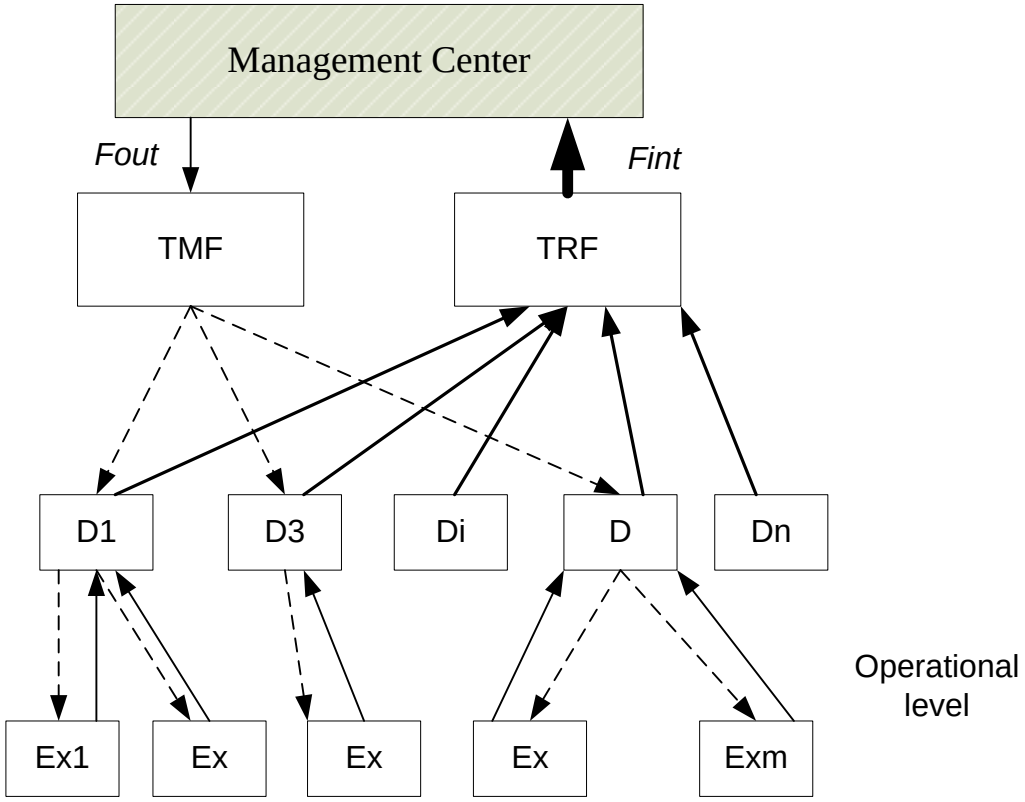

Fig. 1. Hierarchical control information construction

Hierarchical control is based on clear principles of one-man management. Management body is marked with shading in figure 1. This is the main Management Center. Information outflows come out from this center (*Fint)*. Information inflows come into the management center (*Fout*). The management center is served by two units, transformation of management flows (TMF) and transformation of reporting flows (TRF). TMF unit services management (downstream) flows. TRF unit services reporting (upstream) flows. There can be many levels in a real control scheme. But there are three levels applied in this scheme: top, medium and operational. This is necessary for analysis.

TMF unit (top management level) specifies management flows and sends them to the level of distributors. Distributors (D) (medium management level) detail managerial instructions and convert them into technical or industrial assignments. These assignments are sent to the operational level (lowest management level) for executors (Ex). Management flows are marked with a dotted line. Executors perform the assignment and inform management about the results. This creates a system of reporting or upstream flows. Upstream flows are more diverse, as each executor describes the features of the performance of his assignment. As many assignments are at

the operational level, as many different upstream flows are transmitted to the top level. Upstream flows are shown in solid lines. This suggests that the intensity of reporting flows is higher than the intensity of management flows. Distributors send reporting flows to TRF unit. TRF unit systematizes reporting flows, reduces them in volume, but still the information diversity in these flows is much higher than in management flows. This is shown with a thicker arrow that shows the total reporting flow coming in for management.

An example can be given here from sectoral management practice in the USSR. Management documentation and instructions were prepared by a division of 10-20 people, more or less without computational processing. As a rule, reporting documentation was processed by sectoral Main Data Processing Center (MDPC), which employed up to a hundred employees. MDPC obtained information from regional processing centers (distributors level), where dozens of employees worked.

The volume of reporting documentation, systematized and classified in the MDPC, amounted to thousands of pages or more. At the same time, total annual management documentation did not exceed 100 pages. Reporting documentation was drawn up using computer processing methods. Drawing up of reporting documentation with computer processing was much more time consuming than preparation of management information.

Figure 2 shows information construction of the hierarchical management cycle.

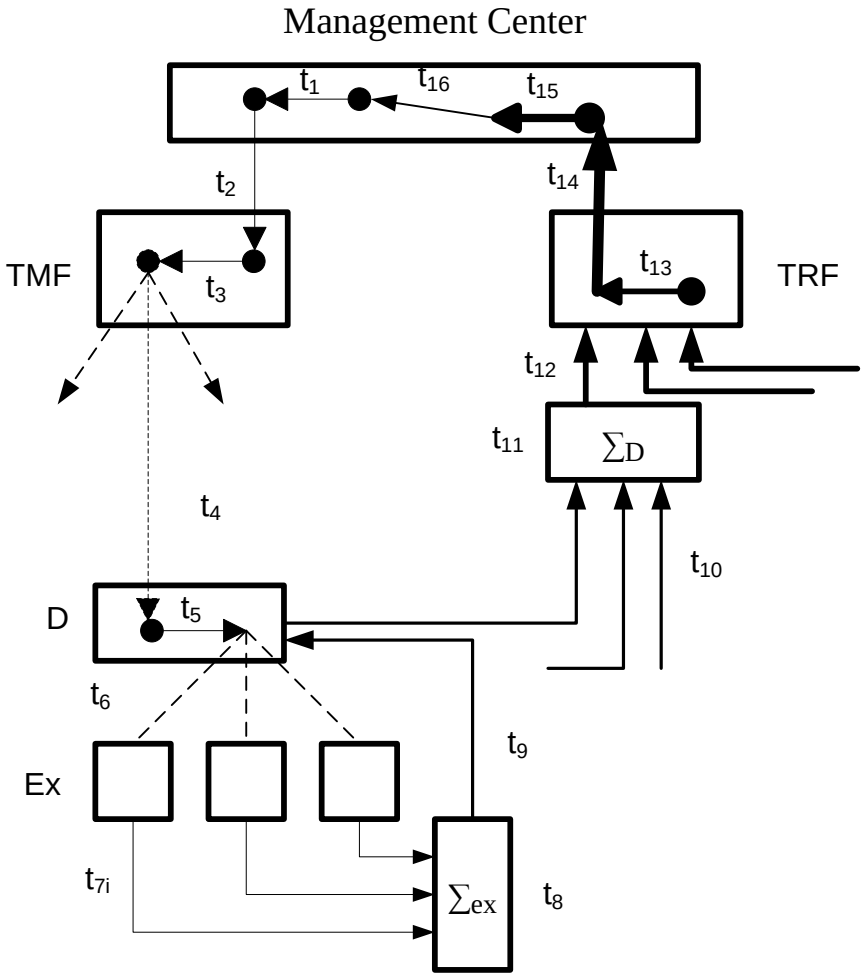

Fig. 2. Hierarchical management cycle information construction

Figure 2 shows the following symbols: t_1 – time of approval and decision-making at the top level; t_2 – time of transfer of managerial decision to TMF for technical follow-up; t_3 – time of technical follow-up of the decision for transfer to distributors level; t_4 – time of transfer of

managerial decision to distributors (parallel process); t_5 – time of technical follow-up for assignment transfer to the executors level; t_6 – time of transfer of managerial decision to executors (parallel process); t_{7i} – time of transfer of reporting information about the executed assignment to the adder (Σ_{ex}) of the executors level (sequential process); t_8 – time of summing up of reporting information from executors; t_9 - time of transfer of reporting information on executed assignments to the distributor; t_{10} – time of correction and transfer of reporting information about executed assignments to the adder (Σ_{D}) of the distributors level (sequential process); t_{11} – time of integration and systematization of information in the adder; t_{12} - time of transfer of the reporting information to TRF; t_{13} – time of systematization of reporting information in TRF for transfer to top management; t_{14} – time of transfer of systematized reporting information to top management; t_{15} – the analysis by the top management of systematized reporting information; t_{16} – development of proposals by top management based on reporting information.

The total time of hierarchical management cycle T_{ch} is determined by the formula

$$T_{ch} = t_1 + t_2 + t_3 + t_4 + t_5 + t_6 + N1\,(t_7) + t_8 + t_9 + N2\,(t_{10}) + t_{11} + N3\,(t_{12}) + t_{13} + t_{14} + t_{15} + t_{16} \quad (1)$$

Here N1 is the number of executors; N2 – the number of distributors on one level; N3 – the number of levels of distributors. The time of management flows T1 is determined as

$$T1_h = t_1 + t_2 + t_3 + t_4 + t_5 + t_6 \quad (2)$$

The time of reporting flows T2 is determined as

$$T2 = N1\,(t_7) + t_8 + t_9 + N2\,(t_{10}) + t_{11} + N3\,(t_{12}) + t_{13} + t_{14} \quad (3)$$

Comparison of (2) and (3) expressions gives grounds to state that the time of reporting information flows under hierarchical control is much longer than the time of management information flows T2 >> T1.

Subsidiarity management structure

Subsidiarity system is characterized by the creation of additional management centers. Figure 3 shows the information construction of subsidiarity management. Management body is marked with shading in figure 3. This is the main management center and local management centers (LM).

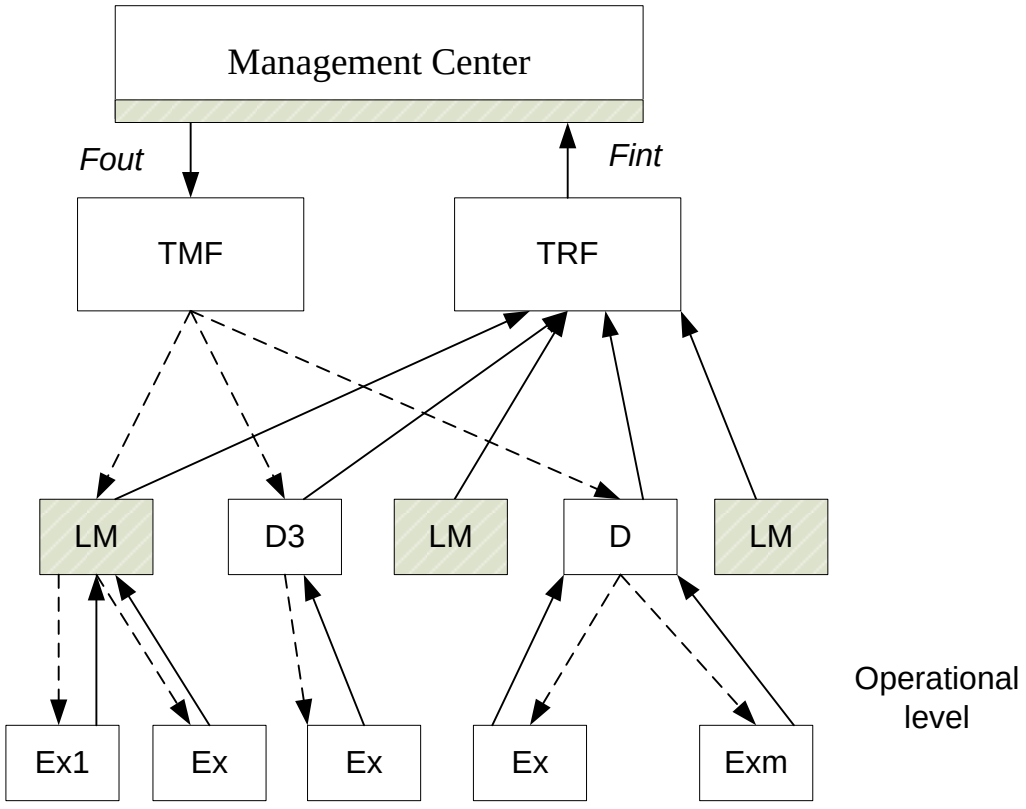

Fig. 3. Subsidiarity management information construction

A shift in management powers from the center to the periphery is typical for subsidiarity control. Local management centers usage shortens the control cycle. The total time of subsidiarity management cycle T_{cs} is determined by the formula obtained by modifying formula (1).

$$T_{cs} = t_1 + t_2 + t_3 + t_4 + t_5 + t_6 + Ns\,(t_7) + t_8 + t_9 + t_{5c} \quad (4)$$

Here t_{5c} is the time of approval and decision-making at local management level; Ns is the number of executors at the local subsidiarity management center.

If

$$T_{cs} \approx T_{ch}, \quad (5)$$

it is reasonable to use hierarchical management, since there is a saving of managerial and material resources in this case, and the overall system reliability increases.

If

$$T_{cs} << T_{ch} \quad (6),$$

it is reasonable to use subsidiarity management.

In addition, it is necessary to take into account the time of change in the state of the object δT_{so}. If

$$T_{cs} < \delta T_{so}, \ \& \ \delta T_{so} < T_{ch} \quad (7),$$

it is reasonable to use subsidiarity management.

If $T_{cs} > \delta T_{so}$, then the object is uncontrollable, and another control method must be selected.

Subsidiarity management is based on the transfer of managerial and legal functions from the center to the periphery. The use of the subsidiarity model in modern conditions takes into account the interrelated conditions: the complication of information management models; compatibility of functional blocks; elimination of intermediate links; globalization; convergence.

Ensuring the compatibility of functional blocks is achieved by integration and application of standardization, harmonization and certification methods. Intermediate links are eliminated based on technologies, systems and organizations integration (including vertical).

With hierarchical management and increase in the number of levels of a company or corporation, the limit of the effectiveness of hierarchical management is reached. In terms of control stability, subsidiarity control can create feedback loops. These loops, if left unattended, can cause control instability. An example is the conflict of interests between the interests of different departments within one company.

On the other hand, local loops, when assigning some general criterion, serve as the basis for the company's self-organization. Under these conditions, there is a transition from linear economy to nonlinear one (Zhang, 2013). This is an advantage of subsidiarity management.

Subsidiarity management is always effectively used in the armed forces in the conduct of hostilities. Hierarchical management requires less qualification of employees and is effective under stereotyped conditions. Each lower level simply executes an order of a higher level. Each individual performs at a certain level only his or her own functions. Such control resembles a product assembly line.

Subsidiarity control requires highly qualified employees at local management centers in comparison with distributors (Singh, 2012). It is more adaptive and technologically corresponds with intelligent control technologies. Subsidiary control is applicable to hierarchical and network structures. With a large number of executors and network management, subsidiary control essentially solves the problem of clustering control objects and reduces the dimension of control object. One of the most developed organizations in management field, the US Department of Defense, repeatedly applied subsidiarity control under different mottos. The most famous campaigns were called “Power to the periphery”. This is fighting in North Africa against Rommel during the Second World War. These are actions under the Desert Storm Operation against Saddam Hussein. The positive experience of these operations indicates effectiveness of subsidiarity control under complex unpredictable conditions.

3. Conclusion

For simple and linear types of management, there is no need to apply subsidiarity management. If the system or control object becomes more complex, subsidiarity management approach should be used. With distributed control and long control chains in the presence of time

delays comparable to the time of change of control object, subsidiarity management is also mandatory. Simplified expressions (1-7) provide an opportunity to assess the need for a particular type of management. Therefore, subsidiarity management is preferable for complex and distributed holding entities.

References

Aksakal, 2005 –*Aksakal, B.* (2005). Makeshift information constructions: information flow and undercover police. University of North Texas.

Aldinucci et al., 2009 – *Aldinucci, M., Danelutto, M., Kilpatrick, P.* (2009, February). Towards hierarchical management of autonomic components: a case study. In Parallel, Distributed and Network-based Processing, 2009 17th Euromicro International Conference on IEEE, pp. 3-10.

Birkinshaw, Hood, 2000 – *Birkinshaw, J., Hood, N.* (2000). Characteristics of foreign subsidiaries in industry clusters. *Journal of international business studies*, 31(1), 141-154.

Bitran, Tirupati, 1993 – *Bitran, G.R., Tirupati, D.* (1993). Hierarchical production planning. Handbooks in operations research and management science, 4, 523-568.

Etgar, 2008 – *Etgar, M.* (2008). A descriptive model of the consumer co-production process. *Journal of the academy of marketing science*, 36(1), 97-108.

Goedert, Meadati, 2008 – *Goedert, J. D., Meadati, P.* (2008). Integrating construction process documentation into building information modeling. Journal of construction engineering and management, 134(7), 509-516.

Halpin, 2010 – *Halpin, T., Morgan, T.* (2010). Information modeling and relational databases. Morgan Kaufmann.

Haugland, 2010 – *Haugland, S.A.* (2010). The integration-responsiveness framework and subsidiary management: A commentary. *Journal of Business Research*, 63(1), 94-96.

Karimi et al., 2001 – *Karimi, J., Somers, T. M., Gupta, Y. P.* (2001). Impact of information technology management practices on customer service. *Journal of Management Information Systems*, 17(4), 125-158.

Kilov, Ross, 1994 – *Kilov, H., Ross, J.* (1994). Information modeling: an object-oriented approach. Prentice-Hall, Inc.

Paterson et al., 2002 – *Paterson, S.L., Brock, D.M.* (2002). The development of subsidiary-management research: review and theoretical analysis. *International Business Review*, 11(2), 139-163.

Singh, 2012 – *Singh, D.* (2012). Emerging economies and multinational corporations: An institutional approach to subsidiary management. *International Journal of Emerging Markets*, 7(4), 397-410.

Tajima et al., 1999 – *Tajima, K., Hatano, K., Matsukura, T., Sano, R., Tanaka, K.* (1999, August). Discovery and Retrieval of Logical Information Units in Web. In WOWS, pp. 13-23.

Tsvetkov, 2009 – *Tsvetkov, V.Y.* (2009). Information objects and information Units. *European Journal of Natural History*, 5(2).

Tsvetkov 2014a – *Tsvetkov, V.Y.* (2014). Information Constructions. *European Journal of Technology and Design*, 5(3), 147-152.

Tsvetkov 2014b – *Tsvetkov, V.Y.* (2014). Information Units as the Elements of Complex Models. Nanotechnology Research and Practice, (1), 57-64.

Weber, Coskunoglu, 1999 – *Weber, E.U., Coskunoglu, O.* (1990). Descriptive and prescriptive models of decision-making: implications for the development of decision aids. *IEEE transactions on Systems, Man, and Cybernetics*, 20(2), 310-317.

Zhang, 2013 –*Zhang, W.B.* (2013). Synergetic economics: time and change in nonlinear economics, Vol. 53. Springer Science & Business Media.

Published in Slovak Republic
European Journal of Economic Studies
Has been issued since 2012.
E-ISSN: 2305-6282
2018, 7(1): 48-55

DOI: 10.13187/es.2018.7.48
www.ejournal2.com

National Savings and Financial Sector Reforms in Nigeria: Econometric Evidence

David Umoru [a, *], Rita Efe Etsemitan [b]

[a.] Edo University, Edo State, Nigeria
[b.] Delta State Polytechnic, Otefe Oghara, Nigeria

Abstract

This study seeks to evaluate the exact effect that financial reforms have on national savings in Nigeria from 1985 to 2015 using ARDL estimation technique based on Bewley transformation. The study found that both variables of financial reforms namely, interest rate spread and exchange rate spread had inverse and significant coefficient estimates. Hence, we accept the alternative hypothesis that financial reforms plummet aggregate savings in Nigeria. The study thus recommends the need for the CBN to create adequate financial instruments that are flexible enough to meet risk preferences of financial operators.

Keywords: savings, reforms, Nigeria, ARDL, financial, institutions, exchange rate spread, interest rate spread, Bewley, policy.

1. Introduction

Financial reforms refer to the structural and institutional changes of financial institutions to include new financial products. Recently, the Nigerian financial system has become volatile in an attempt to keep pace with the global economic phenomenon (Eta and Annabori, 2015). To this effect, the sector has been adorned by various reform strategies (Stefan, 2002; Hanson, 2006 and Adeyemi, 2007). A number of banks were pruned down through the recapitalization programme.

One of the major problems of Nigeria is inadequate savings and investment that ought to increase creative capability of the country. This is because a deficiency in national savings put investment on the knife edge. So, in line with Kama (2006), decline in national savings imply a multiplied repercussion on national income.

Regrettably, the policy dilemma facing Nigeria is the problem of sustaining growth in the face of falling savings mobilization. According to Sanusi (2010), the policy problem emanating from the recession that confronted the country after the reform period resulted in negative real interest rates with disincentive effect on savings mobilization.

The resulting low or negative interest rates depress savings and credit creation of banks and investment suffers (Ojo, 2010 and Ogun, Akinlo, 2011). It so bad that channeling of the mobilized savings is most often not carried out through the financial system.

Dependence on unpredictable foreign sources of capital could further plummet the Nigerian nation into a higher debt service burden and this is capable of putting additional severe pressures on the country's exchange rate which is already devalued. Commercial lending to SMEs is virtually in non-existence (Bloch, Tang, 2003; Ogujiuba, Obiechina, 2011). While the risk management of

* Corresponding author
E-mail addresses: david.umoru@yahoo.com (D. Umoru)

financial sectors, and lending practices are inadequate, the stock of non-performing loans is becoming enormous.

In lie with the forgoing, we intend to ask if interest rate spread and exchange rate spread increases or decreases aggregate savings in Nigeria. The basic objective of this study is to empirically ascertain the impact of interest rate spread and exchange rate spread on aggregate savings in Nigeria. This research paper is divided into five parts. The introduction which is followed by the literature review. The methodology of the research, discussion of regression results and conclusion.

2. Literature Review

The theoretical literature on financial sector liberalization plus reforms is vast dating back to theory of McKinnon (1973) and Shaw (1973). The theory upholds the fact that the financial sector is a driver of economic advancement via financial growth. Accordingly, when a financial sector is repressed then it can only respond inertly to real-sector needs (Onwioduokit, 2006; Soludo, 2005; 2007).

In Nigeria, Ikhide and Alawode (2001) examined the impact of financial reforms on macroeconomic stability. Using discriminant analysis, they found wrong sequencing as cause of poor performance of the financial reforms. Okpara (2011) found little or no significant impacts of financial reforms on financial deepening.

To Iganiga (2010) and Omankhanlen (2012), increase in scope of financial reforms is a process instead of event to consolidate the emerging confidence in financial institutions. Ogwumike and Ofoegbu (2012) found that financial liberalization is significant determinant of financial stability. Obviously, this section provides a concise empirical review of financial reforms in relation to savings. This is so given that empirical studies on the impact of financial reforms on national savings are few hence the present study.

3. Theoretical Framework

The theory guiding this study is rooted on capital accumulation theory. With capital accumulation, it is finance, and not saving, along with entrepreneurial long-term expectations, which are the prerequisites to capital accumulation. Savings, plays role of preservation of monetary stability of economy (Ziorklui, 2001 and Yang, 2012).

Increased household access to consumer credit or housing finance works to decrease private savings. Hence, when financial sector is autonomous, then the market can pool funds and efficiently allocate funds. The market signal of price allows funds to move to where it marginal product is highest.

In the face of a large pool of financial resources, the bank seeks investors and freeing the credit allocation function from the monetary authorities and placing it in the hands of the market ensures that funds will not go to borrowers that cannot ensure a meaningful return on the money.

Model Specification

Considering the following specification of $ARDL(1,0)$ model of financial reforms containing I(1) regressors and direct deterministic trend,

$$\phi(L)z_t = \partial_0 + \partial_1 t + \beta' y_t + \upsilon_t, \quad t = 1,2,3,...,T \qquad (3.1)$$

where z_t is a scalar, $\phi(L) = 1 - \phi L$, L is one-period delay operator, y_t is a $(k \times 1)$ vector of regressors integrated of order one so that:

$$y_t = y_{t-1} + \varepsilon_t \qquad (3.2)$$

and $\beta = (k \times 1)$ vector of unknown parameters. Applying the decomposition $1 - \phi L = (1 - \phi) + \phi(1 - L)$ to (3.1), z_t can be expressed as in line with Patterson (2000):

$$z_t = \alpha + \gamma t + \delta' y_t + \mu_t \qquad (3.3)$$

Where,

$$\alpha = \frac{\partial_0}{1-\phi} - \left(\frac{\phi}{1-\phi}\right)\gamma$$

$$\mu_t = \sum_{i=0}^{\infty} \phi^i \upsilon_{t-i} - \phi \sum_{i=0}^{\infty} \phi^i \delta^{'} s_{t-i}$$

From (3.1) and (3.3) it is clear that z_t and y_t are individually I(1), and must be co-integrated hence we obtain:

$$z_{t-1} = \alpha_1 + \gamma t + \delta' y_t + f_t \qquad (3.4)$$

Where,

$$\alpha_1 = \alpha - \gamma,$$

$$f_t = \mu_{t-1} - \delta^{'} s_t$$

and f_t is an I(0) process with variance σ_f^2. Given that the asymptotic properties of the OLS estimators of the short-run and long-run parameters are to be derived within the context of the $ARDL(1,0)$ model, we thus transform equation (3.1) to the partitioned regression model in the matrix form as:

$$z_T = X_T b + z_{T-1}\phi + e_T \qquad (3.5)$$

Where,

$$z_T = (z_1, ..., z_T)', \quad z_{T-1} = (z_0, ..., z_{T-1})'$$

$$\tau_T = (1, ..., 1)', \quad t_T = (1, ..., T)'$$

$$Y_T = (y_1, ..., y_T)', \quad X_T = (\tau_T, t_T, X_T)$$

$$e_T = (e_1, ..., e_T)', \quad b = (\partial_0, \partial_1, \beta')'$$

Given the $ARDL(p,q)$ model in line with Patterson (2000),

$$Z_t = \partial_0 + \sum_{j=0}^{q} \beta_j L^j Y_t + \sum_{i=1}^{p} \Im_i L^i Z_t + s_t \qquad (3.6)$$

With L denoting the lag operator, equation (3.6) can be reparameterized to have:

$$\left(1 - \sum_{i=1}^{p} \Im_i L^i\right) Z_t = \partial_0 + \sum_{j=0}^{q} \beta_j L^j Y_t + s_t \qquad (3.7)$$

Such that:

$$\sum_{j=0}^{q} \beta_j L^j Y_t = \sum_{j=0}^{q} d_j Y_t - \sum_{j=1}^{q} \beta_j Y_t + \sum_{j=1}^{q} \beta_j Y_{t-1}$$

$$- \sum_{j=2}^{q} \beta_j Y_{t-1} + \sum_{j=2}^{q} \beta_j Y_{t-2} - \sum_{j=3}^{q} \beta_j Y_{t-2} + ... - \beta_q Y_{t-q+1}$$

$$= \sum_{j=0}^{q} \beta_j Y_t - \sum_{j=1}^{q} \beta_j \Delta Y_t - \sum_{j=2}^{q} \beta_j \Delta Y_{t-1} - ... - \beta_q Y_{t-q+1}$$

$$= B_0 Y_t - \sum_{j=0}^{q} B_j \Delta Y_{t-j+1} \qquad (3.8)$$

Where,

$$B_0 = \sum_{j=0}^{q} \beta_j$$

$B_1 = \sum_{j=1}^{q} \beta_j, ..., B_q = \beta_q$

Similarly,

$$\left(1 - \sum_{i=1}^{p} \Im_i L^i\right) Z_t = Z_t - \sum_{i=1}^{p} \Im_i L^i Z_t$$

$$= Z_t - \sum_{i=1}^{p} \Im_i Z_t + \sum_{i=1}^{p} \Im_i Z_t - \sum_{i=1}^{p} \Im_i Z_{t-1} + \sum_{i=2}^{p} \Im_i Z_{t-1}$$

$$- \sum_{i=2}^{p} \Im_i Z_{t-2} + \sum_{i=3}^{p} \Im_i Z_{t-2} + ... + \Im_p Z_{t-p}$$

$$= \left(1 - \sum_{i=1}^{p} \Im_i\right) Z_t + \sum_{i=1}^{p} \Im_i \Delta Z_t + \sum_{i=2}^{p} \Im_i \Delta Z_{t-1} + ... + \Im_p \Delta Z_{t-p+1}$$

$$= (1 - \Gamma_1) Z_t + \sum_{i=2}^{p} \Gamma_i \Delta Z_{t-j+1} \quad (3.9)$$

Where,

$\Gamma_1 = \sum_{i=1}^{p} \Im_i$

$\Gamma_2 = \sum_{i=2}^{p} \Im_i, ..., \Gamma_p = \Im_p$

Thus, a re-specification of equation (3.7) becomes:

$$Z_t = \frac{\partial_0}{1 - \Gamma_1} + \frac{B_0}{1 - \Gamma_1} Y_t - \left(\frac{\sum_{i=1}^{q} B_j}{1 - \Gamma_1}\right) \Delta Y_{t-j+1} - \left(\frac{\sum_{i=1}^{p} \Gamma_i}{1 - \Gamma_1}\right) \Delta Z_{t-j+1} + \frac{s_t}{1 - \Gamma_1} \quad (3.10)$$

When,

$$p = q = 1, \ \Gamma_1 = \Im_1$$
$$B_0 = \beta_0 + \beta_1, \ B_1 = \beta_1$$

Equation (3.10) reduces to:

$$Z_t = \frac{\partial_0}{1 - \Im_1} + \frac{\beta_0 + \beta_1}{1 - \Im_1} Y_t - \frac{\beta_1}{1 - \Im_1} \Delta Y_t - \frac{\Im_i}{1 - \Im_1} \Delta Z_t + \frac{s_t}{1 - \Im_1} \quad (3.11)$$

Owing to contemporaneous links between variables, we adopted the Bewley transformation which utilizes instrumental variables such that Z_{t-1} becomes the instrument for ΔZ_t. In any case, the $ARDL(p,q)$ model specification is augmented with suitable number of lagged changes in regressors. Degree of augmentation essential is influenced by condition $q > w+1$ or not. The augmented form of (3.11) becomes:

$$z_t = \partial_0 + \partial_1 t + \sum_{i=1}^{p} \phi_i z_{t-i} + \beta' y_t + \sum_{i=0}^{m-1} \gamma_i' y_{t-i} + v_t \quad (3.12)$$

$$\Rightarrow \Delta \ln(ngs)_t = \partial_0 + \partial_1 t + \sum_{i=1}^{p} \partial_2 \Delta \ln(ngs)_{t-i} + \beta' y_t + \sum_{i=0}^{p} \partial_3 \ln(irs)_{t-i}$$
$$\sum_{i=0}^{p} \partial_4 \ln(exr)_{t-i} + \sum_{i=1}^{p} \partial_5 \Delta \ln(cin)_{t-i} + \mathrm{B}ecm + v_t \quad (3.13)$$

where $\beta' y_t = \beta_1 \ln(ags)_{t-1} + \beta_2 \ln(irs)_{t-1} + \beta_3 \ln(exr)_{t-1} + \beta_4 \ln(cin)_{t-1}$

$$m = max(q, w+1),$$
$$\gamma_i = \beta_i^* - A_i' g,$$
$$i = 0,1,2,\ldots,m-1,$$
$$A_0 = I_k$$
$$\beta_i^* = 0 \quad \forall i \geq q,$$
$$A_i = 0 \quad \forall \geq w,\ I_k = (k \times k)$$

In this augmented specification, no contemporaneous correlation exists and OLS estimators of the short-run and long-run parameters of (3.12) are efficient. The variables utilized in the specification and estimation are savings-GDP ratio (ngs), interest rate spread (irs), exchange rate spread (exr), currency intensity (cin). In the above model, Δ is the first-difference operator, $\partial_2, \partial_3, \partial_4, \& \partial_5$ are short-run coefficients while $\beta_1, \beta_2 \,\&\, \beta_3, \& \beta_4$ are long run coefficients.

3.1. Data Description and Sources

Exchange rate spread is difference between official exchange rate and parallel (black market) rate. In this study, we utilized Bureau de Change (BDCs) as a proxy for black market rate. Interest rate spread is difference between lending and savings rate. Cash intensity was measured by the ratio of currency in circulation to broad money supply. Given inception of smart money and technological advancement in financial sector, this variable captures the ratio of cash in circulation to broad money supply. The data on variables were acquired from the publications of CBN.

4. Empirical Analysis

The time series property of the variables was ascertained using both Augmented Dickey Fuller and Phillip-Perron tests. All variables were found to be non-stationary at their level since each reported absolute t-value is not greater than Mackinnon 5 % critical values of 3.896 and 5.428 for ADF with PP test respectively. The results reported in Table 1 nevertheless, confirm that all the variables in the study are integrated of order one.

Table 1. Stationarity Test Results

Variables	ADF Test Results		PP Test Results	
	No Trend	Trend	No Trend	Trend
Ln(ngs)	1.384	-1.579	1.869	-1.586
Ln(irs)	-1.721	-2.862	-2.954	-6.703
Ln(exr)	-2.542	-1.578	-2.725	-1.591
Ln(cin)	-1.546	-1.756	-2.856	-1.169
Δ Ln(ngs)	-8.672	-8.645	-7.586	-8.486
Δ Ln(irs)	-9.586	-5.251	-5.635	-6.2867
Δ Ln(exr)	-9.572	-5.792	-6.236	-5.419
Δ Ln(cin)	-8.425	-5.580	-6.928	-5.357

From the Bounds testing results in Table 2, there is co-integration between financial reforms and savings in Nigeria. This is made evident by an F-statistic 5.28 which is significant at 5 % level for both the upper and lower bounds.

Table 2. ARDL Bounds Testing Results

Test Statistic	Computed F-Statistic	5 % Critical Bounds. Upper Bound: I(1)	5 % Critical Bounds. Lower Bound: I(0)
Bounds Test	5.28*	4.72	3.45
* denotes rejecting null hypothesis of no co-integration at 5 % level.			

4.1. Analysis of Short-run Estimates

The short-run estimates of the ARDL model are presented in Table 3 and we wish to state that the ARDL short-run estimates are parsimonious, parsimonious in view of coefficient estimates up to lag 3 were estimated but to avoid unwieldy analysis, we restricted analysis to lag 1. The short-run results reveal a statistically significant relationship between national savings and interest rate spread and exchange rate spread in Nigeria.

The sign of the short-run co-efficient estimate for interest rate spread at one-lag (-0.243) is inverse and it conformed to theoretical expectations. Also, the coefficient estimate of exchange rate spread of the CBN (-0.163) is negative just as expected. In effect, a rise in elasticity of the exchange rate spread and interest rate spread both reduces aggregate savings in Nigeria. Specifically, a 10 % increase in exchange rate spread and interest rate spread would generate about 2.43 % and (1.63) decrease in national savings.

In addition, the undertakings in the exchange rate market affects savings as some economic agents save currencies in their domiciliary accounts for the rationale of speculation. There is insignificant direct relationship concerning savings and cash intensity. The positive coefficient of cash intensity (1.038) is an indication that recent financial reforms are reducing too much paper money in circulation and as such creating avenue for cashless economy. In effect, financial reforms could reduce the transaction and maintenance cost of paper money. However, its effect is weak.

The error correction coefficient (-0.935) is negative besides statistically significant. This indeed implies that with variation in interest rate spread, exchange rate spread together with cash intensity, about 93 % of the disequilibrium error in national savings in Nigeria would be adjusted annually. The speed of adjustment is rather rapid.

Table 3. ARDL Results for National Savings in Nigeria

Variables	Short-run Estimates	Long-run Estimates
Δ Ln(ags)$_{(t-1)}$	0.532 (7.148)^{A}	
Δ Ln(irs)(-1)	-0.243 (-4.591)^{A}	
Δ Ln(exr)(-1)	-0.163 (-2.734)^{AA}	
Δ Ln(cin)(-1)	1.038 (1.296)	
Ln(irs)		-1.541 (-3.957)^{A}
Ln(exr)		-0.528 (-2.134)^{AA}
Ln(cin)		1.369 (0.345)
ect$_{(t-1)}$	-0.935 (-18.379)^{A}	
t		1.462 (5.698)
C	1.258 (2.163)^{AA}	2.462 (19.379)^{A}

R-squared = 0.851, A. R-Squared = 0.824, F-statistic = 146.9 (0.000), DW =2.086 Note: [A] ([AA]) indicates significance @ 1%(5%) respectively
R-squared = 0.936, A. R-Squared = 0.914, F-statistic = 157.9 (0.000), DW =1.946 Note: [A] ([AA]) indicates significance @ 1%(5%) respectively

4.2. Analysis of Long-run Estimates

The long-run estimates conform to short-run estimates and value of adjusted coefficient of determination re-validates about 91.4 % goodness of statistical fit. In effect, about 91 % of the systematic variation in aggregate savings is explained by the variation in interest rate spread, exchange rate spread and cash intensity. This shows the existence of a linear and proportionate relationship between national savings, interest rate spread, exchange rate spread and cash intensity.

So, in the long-run, a 10 % growth in interest rate spread reduces national savings up to the tune of 15.41 %. Also, 10 % rise in the spread of exchange rate reduces national savings as a percentage of GDP in the current period by 5.28 %.

The F-statistic of 157.9 explains a good statistical fit of the national savings model to variables of financial reforms. With a Durbin Watson test statistic of 1.946, presence of positive autocorrelation was denied. This undeniably signifies that the short-run variation did not merely result from the use of multiple variables in the model. Thus, the empirical evidence emanating from the error correction results was relied upon for policy decisions. The CUSUM test provides further evidence to stability of our model at the 5 % level as shown in the figure below.

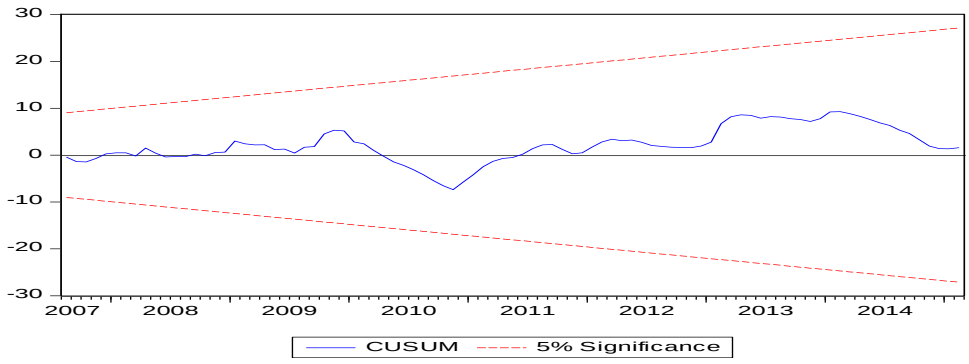

Fig. 1. CUSUM Test Plot

4.3. Policy Implications of Results

• Excessive interest rate spread and exchange rate spread discourages savings mobilization in Nigeria. Hence, the empirical evidence upholds that financial reforms in Nigeria do not intensify but rather plummet aggregate savings.

• Interest rate and exchange rate spreads create disincentive to aggregate savings in Nigeria. It points to huge gap between savings and lending rate in Nigeria. However, structure of Nigerian money market could be responsible for inability of savings to respond favorably and positively to interest rate spread. Rise in exchange rate spread increases currency speculation and discourages savings mobilization. This could be pointing to round tripping in forex market. In addition, the undertakings in forex market affects savings as some economic agents save currencies in their domiciliary accounts for the rationale of speculation.

• Cash intensity is a positive stimulant to national savings in Nigeria. Thus, recent financial reforms with instrumentality of ATMs, electronic banking and POS are reducing excessive paper money in circulation and as such creating avenue for cashless economy. In effect, financial reform reduce the transaction and maintenance cost of paper money.

5. Conclusion

Empirically, we evaluated effects of financial reforms on national savings in Nigeria. The empirical evidence shows that interest rate and exchange rate spreads create disincentive to savings in Nigeria. In effect, a huge gap between savings and lending rate exists in Nigeria. The instrumentality of cash intensity is an innovation to efficacious operation of financial reforms in Nigeria.The findings in this study makes it imperative for recommending the need for CBN to create adequate financial instruments that are flexible enough to avert risk preferences of financial operators.

References

Adeyemi, 2007 – *Adeyemi, K.* (2007). Banking Sector Consolidation in Nigeria: Issues and Challenges. Union Digest.

Bloch, Tang, 2003 – *Bloch, H., Tang, H.* (2003). The role of Financial Development in Economic Growth. Progress in Development Studies, 3(3), 243-251.

Eeta, Anabori, 2015 – *Eeta, A., Anabori, M.* (2015). Financial sector reforms and economic growth in Nigeria. International Journal of Economics, Commerce and Management, 3(9), 151.

Hanson, 2006 – *Hanson, J.* (2006). Financial Liberalization: The Good and the Bad: Finance and Development. 10.

Iganiga, 2010 – *Iganiga, B.* (2010). Evaluation of the Nigerian financial sector reforms using behavioural models. Joural of Economics, 1(2), 65-75.

Ikhide, Alawode, 2001 – *Ikhide, S.I., Alawode, A.A.* (2001). Financial Sector Reforms, Macroeconomic Instability and the order of Economic Liberalization: The evidence from Nigeria. AERC Research Paper, 112.

Kama, 2006 – *Kama, U.* (2006). Recent Reforms in the Nigerian Banking Industry: Issues and Challenges. CBN Bullion, 30(3).

Ogujiuba, Obiechina, 2011 – *Ogujiuba, K., Obiechina, M.* (2011). Financial sector reforms in Nigeria: Issues and challenges. International Journal of Business and Management, 6(6), 222-233.

Ogun, Akinlo, 2011 – *Ogun, T., Akinlo, A.* (2011). Financial sector reform and the performance of the Nigerian economy. The Review of Finance and Banking, 47-60.

Ogwumike, Ofoegbu, 2012 – *Ogwumike, F., Ofoegbu, D.* (2012). Financial liberalisation and domestic savings in Nigeria. The Social Sciences, 7(4), 635-646.

Ojo, 2010 – *Ojo, J.* (2010). The Nigerian maladapted financial system: Reforming tasks and development dilemma.

Okpara, 2011 – *Okpara, G.* (2011). Bank reforms and the performance of the Nigerian banking sector: An empiriical analysis. International Journal of Current Reasearch, 2(1), 142-153.

Omankhanlen, 2012 – *Omankhanlen, A.* (2012). The financial sector reforms and thier effect on the Nigerian economy. Economy Transdisciplinarity Cognition, 45-57.

Onwioduokit, 2006 – *Onwioduokit, E.A.* (2006). Financial Liberation and Saving Mobilization in Nigeria. CBN Bullion, 30(1), 52-62.

Patterson, 2000 – *Patterson, K.* (2000). An Introduction to Applied Econometrics: A Time Series Approach. St.Martin's Press, New York, U.S.A.

Sanusi, 2010 – *Sanusi, L.* (2010). CBN Reforms: Assessing industrial Sector's prospects for Revamp. Punch Newspaper, p. 22.

Soludo, 2005 – *Soludo, C.* (2005). N25 Billion Naira Capitalization: The Journey So Far and its Likely Implications on the Nigerian Economy. Retrieved from Nigeria Business Info: NigeriaBusinessInfo.com

Soludo, 2007 – *Soludo, C.C.* (2007). Nigeria's Financial System Strategy 2020 Plan Paper by the Governor, Central Bank of Nigeria. FSS International Conference, 20. Abuja-Nigeria.

Stefan, 2002 – *Stefan, I.* (2002). Meeting the Challenges for the Chinese Financial Sector: What Have We Learned from Other Countries? Second China Financial Forum. Beijing, China.

Yang, 2012 – *Yang, D.T.* (2012). Aggregate savings and external imbalances in China. Journal of Economic Perspertives, 125.

Ziorklui, 2001 – *Ziorklui, S.* (2001). The impact of financial sector reform on bank efficiency and financial deepening for savings mobilization in Ghana. African Economic Discussion Paper.