SEEJE

South-Eastern Europe Journal of Economics

THE OFFICIAL JOURNAL OF THE ASSOCIATION OF ECONOMIC UNIVERSITIES
OF SOUTH AND EASTERN EUROPE AND THE BLACK SEA REGION

Vol 15 | No 1 | SPRING 2017

contents

Articles

Book Reviews

aim
and scope of ASECU

ASECU was founded in 1996 as Association of South-Eastern Europe Economic Universities with the general aim of promoting the interests of those economic universities in South-Eastern Europe which are public, recognized or financed by the state of origin.

By decision taken in General Assembly of 2007, it was modified in Association of Economic Universities of South and Eastern Europe and the Black Sea Region. Presently, Universities and Research Centres are included to the active full members of ASECU from Albania, Armenia, Bulgaria, Bosnia-Herzegovina, FYROM, Greece, Montenegro, Poland, Romania, Russia, Slovakia, Serbia, Turkey and Ukraine. Also, as associated members, Universities form Egypt and Lebanon.

The specific aims of the Association are:
To promote cooperation between Economic Universities, Faculties, Departments; i.e., especially: a) to exchange views and information about syllabi, b) to exchange undergraduate and postgraduate students and c) to exchange teaching and research staff.

To provide members with the opportunity exchange information, opinions etc. by publishing a relevant scientific journal or by cooperation in elaborating scientific studies in relation to the future development of higher education and research as well as to improve their quality in the field of economic studies and business administration.

To undertake initiatives for the protection of the interests of members and their institutions, so as to be supported by international organizations and in particular by the higher education institutions of the European Union.

To encourage cooperation between universities inside and outside the countries referred to in the Association.

To pursue cooperation in the field of higher education with the consolidation of close relations with other organisations having similar aims, e.g. E.U.A.;

To provide opportunities for harmonising the degrees of faculties and departments of the universities participating in the Association;

To promote cooperation between economic universities, faculties, departments in the field of research for the benefit of the economy, the society, peace and the cultural development of the countries referred to the Association.

Presidency and Board Members

The following Board was elected for a four years period, during the 6th General Assembly of ASECU, on the 6th of March 2015.

Bozidar Cerović, President
University of Belgrade, Belgrade, Serbia

Grigorios Zarotiadis, Vice President
Aristotle University of Thessaloniki, Greece

Atanas Damyanov, General Secretary
University "D. Tsenov", Svishtov, Bulgaria

Vesna Karadzić, Member
University of Montenegro, Podgorica, Montenegro

Fatmir Memaj, Member
University of Tirana, Tirana, Albania

Dejan Mikerević, Member
University of Banja Luka, Bosnia- Herzegovina

Leonid Nakov, Member
"Ss Cyril and Methodious" University, Skopje, FYROM

Dorel Paraschiv, Member
Bucharest University of Economic Studies, Romania

Bogdan Wierzbinski, Member
University of Rzeszów, Rzeszów, Poland

A MARKET FOR HUMAN REPRODUCTION RIGHTS

THEODORE P. LIANOS[*]

Athens University of Economics and Business, Greece

Abstract

The size of the world population approaches 7.5 billion and is predicted to increase in the 21st century. Various studies have estimated that the optimum world population size is around 3 billion. The present note proposes a policy for reducing the world population by introducing a universal law stipulating that each couple will be given three shares, each one representing the right to give birth to half a child. These shares can be traded in an international stock market. Thus, an international market for human reproduction rights will be created where people can sell or buy shares according to the number of children they wish to have. Consequently, on average, there will be one and a half children per family, but families can have none or one, two, three, etc. children, depending on their supply of shares. This policy could reduce world population to approximately 4 billion in about a century.

*Corresponding Address: Theodore P. Lianos, Professor Emeritus of Economics, Athens University of Economics and Business, Athens, Greece. E-mail: tplianos@aueb.gr

Introduction

There is no doubt that our planet is heavily overpopulated. Today (January 2017) the world population is 7.5 billion and is projected to rise in the next decades. According to a recent study by the International Institute for Applied Systems Analysis (Lutz *et al*., 2014a, 2014b), world population is likely to peak at 9.4 billion around 2070 and then decline to about 9 billion by the end of the century. According to a United Nations study (Gerland *et al*., 2014), the world population can be expected to grow to 9.6 billion in 2050 and to 10.9 billion in 2100. Despite their differences, both studies predict a thirty percent increase in world population in the next 40 to 50 years.

Attempts to estimate the optimal size of world population seem to agree, albeit based on different methods, that the optimal size is two to three billion (Daily *et al*., 1994; Pimentel *et al*., 1994; Pimentel *et al*., 2010; Lianos 2013, Lianos and Pseiridis 2015). Even allowing for a 50% error, the conclusion to be drawn by comparing the size of current to optimal population is that the Earth is overpopulated (Bergaglio 2016).

The gap between the actual and the optimal size of world population is huge, with catastrophic consequences for the condition of the planet and, by extension, for the masses of people living on it. However, with the exception of China, the leaders of the world, political, religious, etc. refuse to face the problem of overpopulation. Birth control is an issue that no one wants to even discuss. There are well known reasons for the unwillingness of political and religious leaders to confront the challenges of overpopulation, but the urgency of the situation outweighs these reasons.

The present short note suggests that birth control through a market for human reproductive rights may have a strong impact towards reducing population, while allowing people some choice in the matter.

A Brief Review

Concern about the effects of overpopulation and the proposal for keeping population limited in size has been a millennium-old issue in relevant literature.

Plato, in the fifth century B.C., briefly discussed the optimum size of population and some ways for maintaining it at that level.

In the Republic (Book V), human reproduction activity for women is limited between the ages of twenty and forty, and for men "after the hot period of youth until fifty five". In the Laws (Book V), Plato speaks of offering incentives in the form of moral rewards and also admonition by the elders to the young. However, if the population of the city exceeds the optimum, "there is the old way,…i.e. colonies". If the city becomes underpopulated because of diseases or wars, immigration could, relunctantly yet out of necessity, be allowed.

Aristotle also believed that regulation of the population was necessary. He thinks that "there must be a fixed limit on procreation of offspring" (Politics 1335b, 23-24).

He also suggests that "it is fitting for women to be married at about the age of eighteen and for men at thirty-seven or a little earlier" (1335a, 28-30). The last suggestion in made for eugenic purposes, but it is clear that it can lead to population growth control. Furthermore, Aristotle recommends, for the same purpose, that "persons exceeding this age (of fifty) by four or five years must be discharged from the duty of producing children for the community" (1335b, 35-38). It is characteristic of the significance Aristotle attributes to population control that he suggests that "if any people have a child, as a result of intercourse in contravention of these regulations, abortion must be practised on it before it has developed sensation and life" (1335b,24-25).

Thomas Robert Malthus, in his *Essay on the Principle on Population* (1798), states that population increases when the means of subsistence increase, unless prevented by three powerful and apparent checks, namely moral restraint, vice, and misery. The last two are to be avoided. Moral restraint is defined as "our obligation not to marry till we have a fair prospect of being able to support our children".

In recent literature, concern about population growth has been expressed in three studies published in the mid-fifties by Huxley (1956), Nelson (1956), and Osborn (1958), and, of course, a little later, by Ehrlich's *Population Bomb* (1968).

There have also been populationist periods during which high fertility rates were favoured. After the devastating thirty years' war in Europe and the wars of Louis XIV that ensued, efforts were made to stimulate population growth, particularly in France. The same was true for the periods after the World Wars I & II in many European countries.

Misdirected Efforts

Warnings by scientists about the current state of the planet and the obvious environmental and social problems related to overpopulation do not seem to have a sufficient impact on the reasoning of world leaders who manage world affairs, namely governments, political and religious leaders, the United Nations, etc. For example, the recent Paris Agreement about climate change seems to ignore -or pretend to do so- that the real root of the problem is the need to supply goods and services to satisfy the needs of peoples that continue to grow in size by two hundred and fifty thousand every day. Overpopulation in most countries, as well as overconsumption by wealthy nations, is ignored in the hope that deus ex machina, that is technology, will continue to take care of the problems our inertia allows to accumulate.

Despite the many serious problems created by overpopulation, population control is a very sensitive issue. Typical of the prevailing political climate regarding population control is a statement by Babatunde Osotimehin, Executive Director of the UN Population Fund, which is as follows: "The ICPD Programme of Action marked a fundamental shift in global thinking on population and development issues. It moves away from a focus on reaching specific demographic targets to a focus on

the needs, aspirations, and rights of women and men" (United Nations. 2015). This comment may be taken as indirect criticism of the population policy of China, but it also indicates that population controls will not become part of the world political agenda in the near future.

China' One Child Policy

In the recent past, many nations have seen the risks of overpopulation and have taken measures to discourage the large family model. The idea of introducing birth control has been gaining ground, but so far this is done through providing information to younger couples, encouraging the use of contraceptives, and using moral suasion. The only exception is China's one-child policy introduced in 1980.

The one-child policy introduced by the Chinese government allowed some exceptions, mainly in the cases of rural areas and minorities. Even so, the policy brought about two undesirable results, one of which had been expected, namely, problems related to the social insurance system, and one that had not been anticipated, at least not to a high extent, namely, the disequilibrium between boys and girls born.

However, the one-child policy has been criticised not so much for the undesirable effects it caused, as for the violation of human rights and personal choice. The options of zero and one child are indeed limiting one's freedom of choice. However, the evaluation of China's one-child policy in the field of ethics should take into account the burden imposed by the present situation on the choices of future generations. The undeniable need for world population reduction is a crucial factor in this respect.

In 2016, China changed its population policy to two children for all families, which is expected to affect mainly urban populations.

International Stock Exchange for Human Reproduction Rights

In this note we are proposing a different way for reducing the size of the population through imposing restrictions while allowing each married couple to have more choices. In short, our proposal for 'one-and-a-half children' is as follows:

(i)   Every couple, on their wedding day, whether the ceremony takes place in church, at the City Hall, or in an attorney's office, will be given three shares by the government, each share entitling the couple to having half a child. Each share will represent the right of the couple to participate in the creation of the next generation and all couples will have equal rights.

(ii)   These rights will be tradable in the world market. Thus, a couple in Canada who wish to have two children can buy one share from a couple in China. Similarly, a couple wishing to have three children would have to buy three shares, and so on. If no couple wishes to sell shares and if all couples wish to have two children, the one-and-a-half policy becomes a one-child policy in practice.

(iii) There are people who do not wish to, or cannot, have children, people who are

happy with one child and people who will be tempted to sell one or all of their shares to earn some money. It is certain that there will be people in all countries who would be able and willing to buy shares. Thus, the one-and-a-half child programme will also become an income transfer programme, probably from relatively rich people to relatively poor ones, within each country and between countries.

(iv) This policy can be applied in each individual country suffering from overpopulation, e.g. China, India, Indonesia, etc. However, since the population problem is universal, the full impact of the policy will become apparent if its application is universal. Thus, it is desirable that the policy should have the support of all governments as well as the support of various institutions, e.g. the Church and other social organisations. It is very likely that some governments that favour the large family model would prefer not to adopt the one-and-a-half child policy. However, if international demand for shares is high and a substantial sum of money is received by those who sell one or more of their shares, then popular demand for the adoption of the plan in these countries would be strong.

(v) In addition to reducing world population, some other positive side-effects are also possible. For example, the black markets for adoption of children existing in some (perhaps many) countries would disappear. Also, very substantial money flows would be directed from rich families and countries to poor ones. Of course, negative side-effects are bound to emerge, as in the case of unintended pregnancies of married women who have sold their shares.

Variations of the basic idea are possible. For example, some people may argue that the right to give birth to children should be given to men and women and not to married couples, since there are many people who wish to have children but not to get married. In other words, the right to give birth to a child is an individual right, distinct from the way couples decide to live. Furthermore, instead of each share corresponding to half-a-child, different values may be given, e.g. 0.6 or 0.4, depending on the rate of population decline desirable.

To facilitate exchanges of reproduction rights, an international stock exchange can be established where reproduction rights will easily and at a minimum cost be sold and bought. Thus, a couple in one geographical region could very easily buy (or sell) a reproduction share from (or to) another couple living in a very distant place.

Needless to say, such a scheme of population reduction will often be violated, at least in the beginning. Problems of non-compliance will certainly arise and no easy treatment is available. However, fines and other measures of an administrative nature can be used so that compliance may be encouraged and non-compliance discouraged. Information about the problem of overpopulation and moral suasion can contribute towards acceptance of the proposed solution by the public.

Comments

It is worth mentioning, in support of the one-and-a-half children proposal, that China's one–child policy was accepted, as the Chinese government claims, by 76% of the population. This can be interpreted as indicating that a policy or a rule, if applied generally, is not necessarily perceived by the public as a coercive restriction. It is reasonable to assume that our proposal would be accepted by a higher percentage because it allows wider choice.

In the history of the world, social problems have been solved or limited to manageable proportions by the imposition of rules, by motivating economic forces, and by a combination of both. Of course, monetarising a problem will not necessarily lead to the best solution, but it is often better than letting things run their own course. Under current circumstances, if population growth is left unchecked, Parfit's repugnant conclusion will certainly be verified. Our proposal for a one-and-a-half child policy is a combination of legislation and economics that also allows a degree of choice.

Reduction in population worldwide will be followed by a general drop in demand for goods and services and a period of deflation and unemployment will arise, at least during the first stages. It is unlikely that price flexibility would be a substantial remedy for the fluctuations of demand and, therefore, very active government policies of demand and income redistribution will become necessary.

We do not expect our proposal to be widely accepted and implemented at present. As we noted in the Introduction, people in a position to raise the issue of overpopulation prefer to remain silent. However, presenting and discussing ideas such as this one is a good way to make people and authorities think about the problem and to be ready to discuss the issue of overpopulation and the risks it entails.

If such a plan is generally adopted, world population would be reduced to half within three to four generations, i.e. in about one century.

References

Aristotle, (2005). *Politics*, Loeb Classical Library, Harvard University Press.

Bergaglio, M. (2016) The contemporary illusion: population growth and sustainability. Environment, Development and Sustainability. doi:10.1007/s10668-016-9842-3.

Daily, G., Ehrlich, A. H., & Ehrlich, P. R. (1994). Optimum human population size. Population and Environment, 15(6), pp. 469–475. doi:10.1007/BF02211719.

Gerland, P., Raftery, A. E., Sevcikova, H., *et al*. (2014). World population stabilization unlikely this century. Science, 346 (6206), pp. 234–237. i:10.1126/science.1257469. (October 10).

Huxley, J. (1956) "World Population", Scientific American, March.

Lianos, T. P. (2013). The world budget constraint. Environment, Development and Sustainability, 15 (6), pp. 1543–1553. doi: 10.1007/s10668-013-9460-2.

Lianos, T. P., Pseiridis, A. (2015). Sustainable welfare and optimum population size. *Environment, Development and Sustainability*, 1-21. DOI: 10.1007/s10668-015-9711-5.

Lutz, W., Butz, W., KC, S., Sanderson, W. C., & Scherbov Cherbov, S. (2014a). Population growth: Peak probability. Science, 346(6209), p. 561. doi:10.1126/science.346.6209.561-a. (October 31).

Lutz, W., Butz, W. P., & Samir, K. C. (Eds.). (2014b). *World population and human capital in the 21st century.* Oxford: Oxford University Press.

Nelson, R. R. (1956) "A Theory of the Low-Level Equilibrium Trap", American Economic Review, December, pp. 894-908.

Osborn, F. (1958) Population: An International Dilemma, The Population Council, N.Y.

Osotimehin, B, (2015) United Nations, ICPD Programme of Action, 20th anniversary edition, p. x.

Parfit, D (1984) *Reasons and Persons*, Clarendon Press, Oxford.

Pimentel, D., Harman, R., Pacenza, M., Pecarsky, J., and Pimentel, M. (1994). Natural resources and an optimum human population. Population and Environment, 15 (5), pp. 347–369. doi:10.1007/ BF02208317.

Pimentel, D., Whitecraft, M., Scott, Z. R., Zhao, L., Satkiewicz, P., Scott, T. J., *et al*. (2010). Will limited land, water and energy control human population numbers in the future? Human Ecology, 38 (5), pp. 599–611. doi: 10.1007/s10745-008-9184-3.

Plato, *Republic* and *Laws.*

INFLUENTIAL FACTORS OF PASSENGERS' EXPENDITURES DURING A CRUISE TRIP: THE CASE OF THE GREEK ISLANDS

GEORGIA PAPADOPOULOU[a*]
EVANGELOS SAMBRACOS[b]
SOFIA XESFINGI[b]
[a]Al Ghurair University, Dubai, UAE
[b]University of Piraeus, Greece

Abstract

Cruise tourism is one of the major components of Greek tourism and tends to be a significant source of income. In recent years, there has been an increase of cruise tourism in Greece. The objective of this study is to provide better understanding of the cruise industry by considering the factors that influence passengers' spending during their cruise trip around the Greek islands. This study relies on a unique sample of 507 cruise passengers who visited Greece by analysing the variables that affect cruise passengers' choice of how they spend their money. Participants were asked to answer various questions about their cruise experience and to provide information about their demographic characteristics. Ordered logit models were used to describe passengers' likelihood to spend more at port cities, on the cruise ship and during their cruise trip in general. The demographic factors show that the probability of spending more during the cruise trip decreases by 19.2% (p=0.097) with passengers' age. Additionally, there is a positive correlation between spending during the cruise trip and the choice of cabin and a negative correlation between spending and passengers' reason for visiting Greece and having the cruise experience. We also found that there is a negative correlation when it comes to frequency of travelling and a positive correlation between spending and Excursions made at port cities during the trip.

Corresponding Author: Georgia Papadopoulou, Assistant Professor, College of Business Studies, Al Ghurair University, PO Box 37374, Dubai, UAE. E-mails: g.papadopoulou@agu.ac.ae; georgiachpapadopoulou@gmail.com

1. Introduction

The choice of a suitably-shaped ship, which can be used both for residence and entertainment and as a means of transportation is called "cruise tourism" (Hobson, 1993). The cruise industry is a growing sector of international tourism (Peisley, 1992) with cruise ships offering tourists the opportunity to visit major ports and discover different cultures and countries. Transport, tourism, entertainment and the trip itself are the main aspects of cruise tourism (Wild and Dearing, 2000).

According to Rodrigue and Notteboom (2012), the cruise line industry has become one of the fastest growing segments of travel industry and it has already developed into a mass market through the usage of large vessels, as compared to the cruise industry of the 1960s. This kind of industry has become a symbol of globalization in terms of market coverage, practices and mobility of assets (Wood, 2000; Weaver, 2005; Chin, 2008).

Cruise tourism is strongly related to the sector of transportation, tourism and travel and it is truly beneficial for social and economic development (Papadopoulou and Sambracos, 2014). This explains the fact that cruise ships not only constitute a means of transport from the home port to the destination port, but also offer a tourism product per se, as well (Orams, 1999). Tourism is the fastest growing industry and, hence, marketing becomes imperative in the tourism sector (Pantouvakis and Patsiouras, 2016). Today, cruise ships constitute a destination for passengers, while ports and surrounding areas become of secondary importance (Dowling, 2006). The main goal for cruise companies is to satisfy every single passenger: the level of satisfaction depends on travellers' expectations and their fulfilment, travellers' emotions and having a sense of equal benefits - otherwise, passengers who are not satisfied may not choose the same cruise company again.

The main cruise line destinations are Florida, the Caribbean, the west shore of Mexico, the USA (particularly Alaska), Canada and the Panama Canal, the Mediterranean (divided into the Eastern and the Western regions), Pacific islands, the Baltic Sea, the shores of Norway, western Africa and the islands of the Atlantic, such as the Canary Islands (Rodriguez and Notteboom, 2012). Thus, the main traffic is concentrated in the Caribbean and the Mediterranean Sea, followed by Scandinavia and the Baltic Sea.

Our research contributes to the aforementioned vein of literature and provides evidence on the factors that influence passengers' expenditures during a cruise trip, namely the case of Greek islands. The purpose of this study is to provide better understanding of the cruise industry by considering the factors that influence passengers' spending during their cruise trip with the help of econometric models.

Passengers' expenditures presented in this paper focus on the factors that influence cruise passengers' spending during their cruise trip around Greek islands. The paper focuses on an interview-based questionnaire of 507 cruise passengers who travelled

from the port of Piraeus and experienced a cruise around Greek islands. This primary research was conducted from September to November on cruise ships, which operated in the Aegean Sea visiting Greek islands.

This paper proceeds as follows: Section 2 presents the Literature Review, Section 3 focuses on the Greek cruise market, Section 4 presents the methodology, the data gathering method and the model used. Section 5 presents the results of the paper, while Section 6 the discussion and Section 7 the conclusions.

2. Literature Review

Many papers have focused on the economic contribution and significance of cruise tourism (Dwyer and Forsyth, 1998; Johnson, 2002; Brida and Zapata, 2010a, 2010b; BREA, 2012) or tourism in general (Ardahaey, 2011). Other papers discuss passengers' expenditures (Gabe *et al.*, 2003; Petrick, 2005; Henthorne, 2010; Brida *et al.*, 2010c, 2010d; Larsen *et al.*, 2013). There are also papers about cruise destinations (Raguž *et al.*, 2012) and some others investigating the competitiveness of the cruise market (Ellis and Kriwoken, 2006).

Customers' experience and their satisfaction have been measured as well (Brida *et al.*, 2010a) along with customer loyalties (Brida *et al.*, 2010d), and motivations (Hung and Petrick, 2011). Papathanassis and Beckmann (2011) support that cruise research lacks a unifying theme and a coherent theoretical framework. Dowling and Cowan (2002) talk about the image of the cruise industry and Klein (2008) is concerned with safety and risk issues.

Hall and Braithwaite (1990) presented an analysis of the Caribbean, which compared the leakage from stopover visitors with cruise visitors. Cruise passengers' economic behaviour is investigated by various authors (Lois *et al.*, 2001; Petrick and Sirakaya, 2004; Duman and Mattila, 2005; Gabe *et al.*, 2006; Polydoropoulou and Litinas, 2007). Andriotis and Agiomirgianakis (2010) explored the behaviour patterns of cruise ship passengers, including motivation, satisfaction and likelihood of return to the port. Leste and Weeden (2004) discussed the importance of collaboration and planning for the development of the cruise industry, focusing on the contradiction between maximising opportunities and sustainable development management.

Cruise tourism offers several benefits to social and economic development. This kind of tourism can benefit national economies of different countries involved in cruise tourism through a positive effect on foreign exchange earnings, taxes, employment, and externalities. Many papers have reported on the economic impact of the entire cruise industry. Some of them exemplify the economic impact on the economies of Central America and, particularly, on the case of Puerto Rico (Seidl *et al.*, 2006).

The research of Larsen *et al.* (2013) proves that cruise passengers' expenditures are lower than those of other tourists. There are also comparatively fewer high spenders and more low spenders among cruise tourists than among other tourists. What

is also remarkable is that both groups of tourists tended to overestimate their total expenditures, with cruise tourists overestimating more than other tourists.

The cruise industry's contribution to the national economy depends on the level of expenditure realised by producers and consumers of the cruise product (Wilkinson, 1999). The economic impact of cruise tourism spreads to the entire economy via an income multiplier effect (Sinclair and Stabler, 1997). In order to identify the flows of economic impact, what should be taken into consideration is whether the port is a homeport or a stopover port (Vina and Ford, 1998).

3. The Greek Cruise Market

Greece ranks high among the most popular cruise destinations in the Mediterranean, due to the country's geophysical characteristics and its extensive island network (427 islands). The majority of cruise programmes that include Greece as a destination visit multiple Greek ports-islands. The Greek cruise market is part of the Mediterranean cruise market and, specifically, of Eastern Mediterranean, comprising four local cruise markets, the Aegean Sea, the Black Sea, the Levant (Cyprus, the Holy Land, Egypt) and Venice – the Adriatic – the Ionian Sea (Diakomihalis, 2006). Cruises in Greece are offered on large, modern ships, starting from the port of Piraeus or foreign ports, running tours approaching national ports or other neighbouring countries.

Greece as an integral part of the Mediterranean is one of the most attractive tourist destinations worldwide. The Greek market has high potential in the cruise industry and in combination with the impact generated within the cruise industry, a series of policies should be implemented to help it become competitive in the international environment and improve its final product.

Greece held third place among the six most attractive cruise destination countries for the year 2012 with 4.8 million passengers (Graph 1). First place was held by the leading cruising market country, namely Italy with 6.5 million passengers and second place by Spain with 5.25 million passengers in 2012. France, Norway and Portugal followed with 2.16, 1.95, 1.07 million passengers, respectively.

Even though Greece ranks third in Europe in terms of number of passengers visiting the country, it holds last place in revenues received from the cruise industry (Graph 2). Greece appears last with €0.6 billion revenues in 2012, while neighbouring Italy earned €4.5 billion, the United Kingdom €2.8 billion, Germany €2.5 billion, Spain €1.3 billion and France €1.22 billion.

Graph 1. Cruise Destinations in Europe, 2012 (in million passengers)
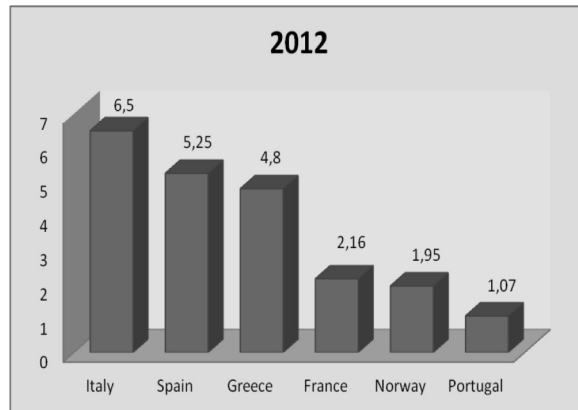
Source: G.P. Wild International Ltd., 2012

Graph 2. Revenues from the cruise industry, 2012 (in billion €)
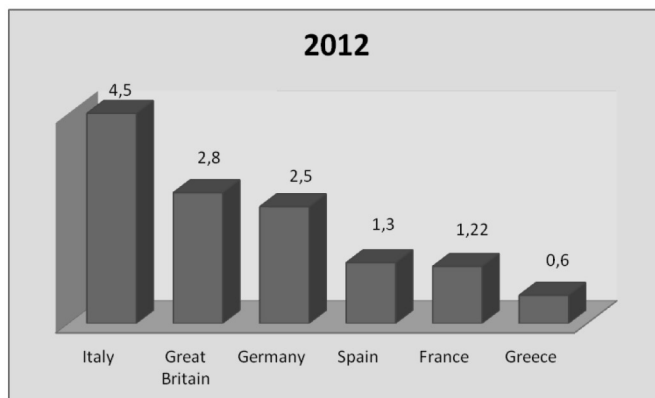
Source: G.P. Wild International Ltd., 2012

4. Methodology

This section presents the research methodology and data used and describes the model implemented.

Data

We conducted an interview-based survey taking a sample of 507 cruise passengers who started their journey from the port of Piraeus in Greece for a holiday around Greek islands. We relied on the Convenience Sampling Technique, i.e. participants were selected on the basis of their proximity and availability to the researcher. Our questionnaire included a wide range of socio-economic characteristics of participants. During their return trip to the final port (port of Piraeus), passengers were asked to answer various questions regarding their personal characteristics and other factors related to their travel facilities. More specifically, demographic variables were grouped as follows: *Gender* takes the value of 1 for male and 2 for female; *Age* comprises four intervals and takes the value of 1 for 18-25, 2 for 26-45, 3 for 46-65 and 4 for >66. *Marital Status* is a categorical variable and takes the value of 1 for singles, 2 for married, 3 for divorcees and 4 for widows/ers. *Nationality* takes the value of 1 for Europeans, 2 for Americans, 3 for Asians, 4 for Australians and 5 for South Africans. *Income* level is grouped in six classes and takes the value of 1 for <€10,000, 2 for €10,001-20,000, 3 for €20,001-30,000, 4 for €30,001-40,000, 5 for €40,001-50,000 and 6 for >50,001.

In addition, passengers were asked to indicate the amount of money they were willing to spend on ports visited or during their stay on the cruise ship, according to their personal choice of accommodation facilities. In particularly, *Port Spending* and *Cruise Spending* comprise 5 intervals, respectively, and take the value of 1 for those who spent up to €50, 2 for €51-100, 3 for €101-150, 4 for €151-200 and 5 for those who spent over €201 at ports and on the cruise ship. *Cabin* reflects whether passengers have booked a standard inside cabin (1), a premium inside cabin (2), a standard outside cabin (3), a premium outside cabin (4), a deluxe cabin (5) or a suite (6); *Frequency* reflects whether passengers have already been on a cruise before (1), have come to Greece only for the cruise (2), have come to Greece once (3), have been on a cruise trip around Greek islands once (4) or none of the above (5); *Excursions* indicates whether someone used the buses the cruise company offered to visit various ports (0) or not (1).

Finally, we constructed the variable *Total Spending*, simply by summing both *Cruise* and *Port Spending*. Therefore, *Total Spending* comprises 8 intervals and takes the value of 1 for those who spent up to €100, 2 for €101-150, 3 for €151-200, 4 for €201-250, 5 for €251-300, 6 for €301-350, 7 for €351-400 and 8 for those who spent over €401 during their cruise trip and it is the sum of *Port Spending* and *Cruise Spending* variables.

At this point, we would like to clarify that cabin class and age intervals were recommended as variables by the biggest Greek cruise company which helped us with the present study.

Model

The likelihood of passengers' spending more on a cruise trip can be described by an ordered logit model defined as follows:

$Pr(Y = c|Xi) = F(Xi\beta),$

where endogenous variable *Y* is spending (*Port Spending*, *Cruise Spending* and *Total Spending*) (c); *F* is the standard logistic cumulative distribution function and X_i is a set of covariates defined as:

$$X_i\beta = \beta_0 + \beta_1 Gender_i + \beta_2 Age_i + \beta_3 Marital\ Status_i + \beta_4 Nationality_i + \beta_5 Income_i + \beta_6 Cabin_i + \beta_7 Frequency_i + \beta_8 Reason_i + \beta_9 Excursions_i$$

where the first five variables comprise demographic factors: *Gender* is a variable that takes the values of 1 and 2, if the participant is male and female, respectively; *Age* is the age of participants clustered as follows: class 1 (18-25), class 2 (26-45), class 3 (46-65), class 4 (≥66 years old); *Marital Status* reflects whether a participant is single (1), married (2), divorced (3), or widow (4); *Nationality* indicates whether someone is from Europe (1), America (2), Asia (3), Australia (4) or South Africa (5); *Income* is the annual personal income of passengers classified into 6 classes, as follows: class 1 (≤€10,000), class 2 (€10,001-20,000), class 3 (€20,001-30,000), class 4 (30,001-40,000), class 5 (40,001-50,000) and class 6 (≥€50,001); *Cabin* indicates whether passengers have booked a standard inside cabin (1), a premium inside cabin (2), a standard outside cabin (3), a premium outside cabin (4), a deluxe cabin (5) or a suite (6); *Frequency* reflects whether passengers have already been on a cruise before (1), have come to Greece only for the cruise (2), have come to Greece once (3), have been on a cruise trip around Greek islands once (4) or none of the above (5); *Reason* takes the value of 1 for passengers who decided to visit Greece to meet new destinations, 2 for those who came to Greece to visit destinations of historic significance, 3 for tourists who came because they had a good feedback from friends/relatives, 4 for passengers who came to learn about the Greek civilization, 5 for those who came for gaining new experiences and 6 for those who came in order to visit their families; *Excursions* indicates whether someone used the buses the cruise company offered to see the various ports (0) or not (1).

5. Results

Before presenting our model estimates, here are some descriptive statistics in Table 1.

Table 1. Descriptive statistics of all variables

Variable	Obs.	Percentage	Cumulative percentage
Total Spending			
≤€100	90	17.75%	17.75%
€101-150	61	12.03%	29.78%
€151-200	69	13.61%	43.39%
€201-250	69	13.61%	57.00%
€251-300	50	9.86%	66.86%
€301-350	20	3.94%	70.80%
€351-400	70	13.80%	84.60%
≥€401	78	15.40%	100.00%
Port Spending			
≤€50	179	25.31%	25.31%
€51-100	130	25.64%	60.95%
€101-150	59	11.64%	72.59%
€151-200	74	14.60%	87.19%
≥€201	65	12.81%	100.00%
Cruise Spending			
≤€50	146	28.80%	28.80%
€51-100	116	22.88%	51.68%
€101-150	85	16.77%	68.45%
€151-200	71	14.00%	82.45%
≥€201	89	17.55%	100.00%
Gender			
Male	226	44.58%	44.58%
Female	281	55.42%	100.00%
Age			
18-25 years old	5	0.99%	0.99%
26-45 years old	70	13.81%	14.80%
46-65 years old	272	53.65%	68.45%
≥ 66 years old	160	31.55%	100.00%
Marital Status			
Single	57	11.24%	11.24%
Married	374	73.77%	85.01%
Divorcee	34	6.71%	91.72%
Widow	42	8.28%	100.00%
Nationality			
Europe	200	39.45%	39.45%
America	251	49.51%	88.96%
Asia	10	1.97%	90.93%
Australia	41	8.09%	99.02%
South Africa	5	0.98%	100.00%

Income

≤ 10,000	34	6.71%	6.7%
€10,001-20,000	63	12.43%	19.14%
€20,001-30,000	107	21.10%	40.24%
€30,001-40,000	175	34.52%	74.76%
€40,001-50,000	53	10.45%	85.21%
≥ €50,001	75	14.79%	100.00%

Cabin

Standard inside	131	25.84%	25.84%
Premium inside	15	2.96 %	28.80%
Standard outside	228	44.97%	27.77%
Premium outside	75	14.79%	88.56%
Deluxe	29	5.72%	94.28%
Suite	29	5.72%	100.00%

Frequency

On a cruise before	246	48.52%	48.52%
Came to Greece only for the cruise	67	13.21%	61.73%
Already visited Greece once	44	8.68%	70.41%
Already been on a cruise in Greece before	11	2.17%	72.58%
None of the above	139	27.42%	100.00%

Reason

Meet new destinations and people	4	0.79%	0.79%
Visit destinations with historic significance	81	15.98%	16.77%
Friends/Relatives have already come	277	54.64%	71.41%
Greek culture/Greek way of living	37	7.3%	78.71%
Gain new experiences	66	13.02%	91.73%
Visit my family	42	8.27%	100.00%

Excursions

No	156	30.77%	30.77%
Yes	351	66.23%	100.00%

As Table 1 shows, more than half of the participants (55.42%) are women, while the majority of respondents (53.65%) are between the ages of 46 and 65. More than 70% of participants are married and the majority come from America (49.51%), while many (39.45%) are Europeans. Finally, the majority have an annual income between €30,001 and €40,000 (34.52%). Moreover, many of them (17.75%) spend up to a total of €100 during their cruise trip, while 15.4% of the passengers spent over €401 on the same trip. 25.64% of participants spent between €51-100 at the ports they visited during their trip and 28.8% of them spent up to €50 on the cruise ship. 44.97% of the tourists stayed in a standard outside cabin (with sea view), 48.52% of cruise passengers had already been on a cruise before, 54.64% of them had friends/relatives who had already visited Greece before and, finally, 66.23% replied that they had the excursions to the Greek islands on the bus the cruise company offered.

Correlation among all variables is presented in Table 2.

Table 2. Correlations among all variables

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Total Spending	1.00											
(2) Port Spending	0.72*	1.00										
(3) Cruise Spending	0.81*	0.30*	1.00									
(4) Gender	-0.05	0.02	-0.09*	1.00								
(5) Age	-0.01	-0.04	0.04	-0.03	1.00							
(6) Marital Status	0.02	0.06	-0.01	0.21*	0.32*	1.00						
(7) Nationality	-0.01	0.03	0.01	0.05	0.01	-0.01	1.00					
(8) Income	0.09*	0.07	0.07	-0.12*	0.05	-0.01	0.23*	1.00				
(9) Cabin	0.11*	0.06	0.11*	0.04	0.06	-0.03	0.4*	0.21*	1.00			
(10) Frequency	-0.08*	-0.03	-0.08	0.06	-0.22*	-0.05	-0.10*	-0.15*	-0.08	1.00		
(11) Reason	-0.08	0.01	-0.11*	0.01	0.01	0.01	-0.15*	-0.11*	-0.05	0.05	1.00	
(12) Excursions	0.12*	0.01	0.15*	-0.01	0.07	-0.03	0.16*	0.18*	0.09*	-0.03	-0.17*	1.00

Note: (*) stands for 5% level of significance.

As table 2 shows, there is not a strong correlation across all variables, since the Pearson correlation coefficient is low (under 0.3 in most cases). A stronger correlation, however, is demonstrated among the three first variables (*Total Spending*, *Port Spending* and *Cruise Spending*). The strongest correlation is to be expected since the *Total Spending* variable is the sum of the other two. In addition, those three variables are only used as dependent variables in our model specifications. Therefore, no collinearity issue arises in this case.

Odds ratios for all specifications are presented in Table 3. Odds ratios can be read as follows: if the odd ratio, a, is bigger than 1 (a>1), then the probability of

a passenger spending more money during the cruise trip increases by (a-1)*100%, whereas the probability decreases by (1-a)*100%, if the odds ratio is under 1 (a<1).

Columns (1a)-(1c) represent the model specification where the dependent variable is the amount of money spent at ports visited (*Port Spending*). Columns (2a)-(2c) represent the model specification where the dependent variable is the amount of money spent on the cruise ship (*Cruise Spending*). Finally, columns (3a)-(3c) represent the model specification where the dependent variable is the total amount of money spent during the cruise trip (*Total Spending*). More specifically, columns (1a), (2a), and (3a) present estimates of the model where only the demographic factors are included. Next, columns (1b), (2b) and (3b) present estimates of the model where the other factors (*Cabin*, *Frequency*, *Reason* and *Excursions*) are included. Finally, columns (1c), (2c), and (3c) present the full-fledged sets where all independent variables are included.

Table 3. Logit estimates (odds ratios) of different specifications (maximum level of Spending is the dependent variable)

	Port Spending (PS)			Cruise Spending (CS)			Total Spending (TS)		
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)
Gender	1.056		1.070	**0.760***		**0.757***	0.837		0.854
	(0.175)		(0.178)	(0.125)		(0.126)	(0.136)		(0.141)
Age	**0.749****		**0.728****	1.100		1.012	0.899		**0.808***
	(0.094)		(0.095)	(0.132)		(0.125)	(0.109)		(0.103)
Marital Status	**1.310****		**1.332****	.959		0.998	1.135		1.193
	(0.153)		(0.157)	(0.111)		(0.117)	(0.131)		(0.141)
Nationality	1.006		0.985	.977		0.896	0.963		0.894
	(0.104)		(0.104)	(0.103)		(0.100)	(0.091)		(0.088)
Income	1.092		1.069	1.095		1.027	**1.124****		1.048
	(0.064)		(0.066)	(0.062)		(0.062)	(0.062)		(0.061)
Cabin		**1.105***	**1.106***		**1.131****	**1.127***		**1.139****	**1.142****
		(.062)	(0.063)		(0.069)	(0.071)		(0.064)	(0.066)
Frequency		0.983	0.966		0.937	0.941		**0.925*****	**0.911***
		(0.043)	(.047)		(0.043)	(0.045)		(0.041)	(0.044)
Reason		1.026	1.035		**0.865****	**0.855****		0.900	**0.895***
		(0.067)	(0.068)		(0.062)	(0.064)		(0.061)	(0.061)
Excursions		1.002	1.033		**1.623*****	**1.654*****		**1.483****	**1.541*****
		(0.169)	(0.180)		(0.270)	(0.284)		(0.245)	(0.263)
Observations	507	507	507	507	507	507	507	507	507
Wald Test	10.01	3.48	14.61	7.25	22.54	27.14	8.34	18.03	25.84
Pseudo-R2	0.0067	0.0022	0.0091	0.0045	0.0145	0.0176	0.0038	0.0104	0.0139

Note: Heteroscedasticity robust standard errors in parenthesis.

***, **, * indicate significance at 1, 5, and 10%, respectively.

As Table 3 shows, of the demographic factors presented in column (1a), only *Age* and *Marital Status* have a statistically significant effect on passengers' willingness to spend more at ports. More specifically, when it comes to the age effect, there is a negative correlation between *Port Spending* and ageing. As age group rises, the likelihood of maximum spending at ports during their cruise trip decreases by 25.1% [(1-0.749)*100%]. When passengers' marital status changes, it is more likely they will spend more, because there is a positive correlation between *Marital Status* and *Port Spending*. Among other factors (*Cabin*, *Frequency*, *Reason* and *Excursions*) presented in column (1b), only *Cabin* has a statistically significant effect on *Port Spending* and this relationship is positive, which means that when passengers select a better cabin to stay in, the likelihood of spending more at ports increases by 10.5% [(1.105-1)*100%]. When including all independent variables (column 1c), it is found that *Age*, *Marital status* and *Cabin* are the three factors with a statistically significant effect on passengers' willingness to spend more at the ports they visit during their cruise trip. More specifically, as the age group rises, the likelihood of spending more at ports during their cruise trip decreases by 27.2%. As passengers' marital status changes, it is more likely they will spend more, because there is a positive correlation between *Marital Status* and *Port Spending*. Finally, when passengers select a better cabin to stay in, the likelihood of spending more at ports increases by 10.6%, because there is a positive correlation between the dependent variable and C*abin*.

In columns (2a)-(2c), where the dependent variable is the amount of money spent on the cruise ship, and focusing on the last column (2c), where all independent variables are included, *Gender*, *Cabin*, *Reason* and *Excursions* are seen to have a statistically significant effect on passengers' willingness to spend more on the cruise ship.

Following this concept, and if one takes into consideration the total amount of money spent both on the cruise ship and at ports visited, which captures the passengers' willingness to spend during the cruise trip (3c), *Age, Cabin, Frequency, Reason* and *Excursions* are found to have a statistically significant effect on our mostimportant dependent variable, i.e., *Total Spending* (as diagnostics at the bottom of Table 3 indicates). More specifically, when it comes to the age effect, there is a negative correlation between *Total Spending* and *Age*, which means that, as age groups rise, the likelihood of spending more during a cruise trip decreases by 19.2%. There is a positive correlation between *Cruise Spending* and *Cabin*, which means that when passengers select a better cabin to stay in, the likelihood of spending more during their cruise ship increases by 14.2%. As we can see, there is a negative relationship between the dependent variable and *Frequency*, which means that the likelihood of passengers who have already visited Greece once spending more during their cruise trip increases by only 8.9%. Between *Total Spending* and *Reason* there is a negative correlation, which means that the likelihood of passengers who decide to visit Greece

to get to know new destinations spending more increases by only 10.5%. Finally, in regard to *Excursions*, passengers who decide to go on excursions at ports are found to be more likely to spend more during their cruise trip by 54.1%.

Overall, independent variables do not alter in sign and remain statistically significant in more than one specification. With respect to the overall performance of our specifications, correlations between *Port Spending*, *Cruise Spending* and *Total Spending* and those predicted range from 74% to 92% (at 5% level of significance), indicating that the appropriateness of our specifications is satisfactory. Finally, Wald Test tests whether all coefficients in the specification are significantly different than zero (with prob>chi2 being lower than 0.05 in all full-fledged sets) and other diagnostics (bottom of Table 3) further confirm the appropriateness of our specifications.

6. Discussion

Understanding what shapes spending in Greece is particularly important for economic policy and decision-makers and the Greek cruise tourism market, since it provides critical information for developing this specific market, which is becoming one of the most important sources of income for Greek economy. According to the statistics of Cruise Lines International Association (CLIA, 2014), there was a decline of 41.8% in the Greek cruise market from 2011 to 2013. As CLIA reports, this decline was, to a large extent, a direct result of the country's dire public sector finances and the sweeping austerity measures introduced as part of the EU bailout package. Accordingly, Piraeus Port Authority S.A. (2016) corroborates CLIAS' statistics with its own report that during the same period there was a decline of 34.1% in the Greek cruise market.

According to Larsen *et al.* (2013), cruise passengers' expenditures are lower than the expenditures of other tourists. This is aligned with research findings by Brida *et al.* (2012) which state that this occurs due to the limited time available for each island (8 hours or less). Our research confirms that the majority of cruise passengers tend to spend less at ports visited (Table 1). Our analysis supports the conclusion reached by Brida *et al.* (2012) that cruise passengers' contributions to local economies are somehow insignificant. Our findings further support Klein (2008) who indicates that the limited land time allowed to passengers does indeed curtail their opportunities to spend money at the destination visited. What is also worth mentioning is that Lye (2011) and Olsen (2012) have claimed that, typically, about 20–40% of passengers do not even disembark while the ship docks.

Cruise ships tend to stay at ports for a relatively short period, forcing their passengers to spend most of their time on board and, thus, spend more on the cruise ship (Larsen *et al.*, 2013); this is why Vogel (2011) underlines that cruise lines depend on increasing on-board revenues in order to maintain profitable operations. In our

case, though, we found that the majority of passengers did not spend so much money on board. This can be explained since our sample was experiencing a cruise trip on medium-sized cruise ships rather than on luxury ships where one can easily spend much more. Moreover, our research took place during a severe economic crisis period in Greece, which hardly makes for extensive money spending. At this point, we should add that passengers were on board mainly during the night, when the cruise ship was sailing so the possibility of spending was not particularly high.

Moreover, we found that, with rising age groups, it is less likely for passengers to spend much money at ports visited. This is to be expected, if one takes into consideration that the elderly are more likely to participate in a cruise trip earlier on in their lives; therefore, we can assume that they have a higher spending capacity when slightly younger. As Lin *et al.* (2015) indicate, total tourism expenditures tend to decrease among the elderly of older ages.

With respect to other factors, passengers who prefer to stay in a better cabin (more expensive) tend to spend more both at ports and on the cruise ship. On the other hand, *Gender* and R*eason* have a negative correlation to *Cruise Spending,* which means that men tend to spend more than women and the same is true about passengers who decide to experience a cruise trip so as to get to know new destinations. According to Wegrzynovski (2007), those of higher age who are male with greater job stability and in full employment prevail in the tourism sector and tend to spend more.

7. Conclusions

Cruise tourism is an important sector of the industry in general and tends to be one of the most significant sources of income for Greece. This paper was conducted during a severe economic crisis period in Greece and this is why we did not find high volumes of passengers' expenditures during a cruise trip around Greek islands.

To conclude, strong correlation appears between the first dependent variable, namely Port Spending, and the independent variables *Gender*, *Marital Status* and C*abin*. There is also significant correlation between the second dependent variable, namely *Cruise Spending,* and *Gender*, *Cabin*, *Reason* and *Excursions*. The three latter, along with *Age* and *Frequency,* are significant for the most important dependent variable, namely *Total Spending*. Therefore, more research should be conducted to explore how these factors can influence passengers' expenditures in other parts of Greece in order for policy makers to better exploit cruise tourism, e.g. in the Ionian Sea, where cruise tourism is increasing.

References

Andriotis, K. and Agiomirgianakis, G. (2010). Cruise Visitors' Experience in a Mediterranean Port of Call. *International Journal of Tourism Research*, 12(4), pp. 390-404.

Ardahaey, F. T. (2011). Economic Impacts of Tourism Industry. *International Journal of Business and Management*, 6(8), pp. 206-215.

BREA (Business Research and Economic Advisors). (2013). *The Economic Contribution of Cruise Tourism in Victoria 2012*. Prepared for: Greater Victoria Harbour Authority.

Brida, J. G. and Zapata, S. (2010a). Cruise tourism: economic, socio-cultural and environmental impacts. *Int. J. Leisure and Tourism Marketing*, 1(3), pp. 205-226.

Brida, J. G. and Zapata, S. (2010b). Economic Impacts of Cruise Tourism: The Case of Costa Rica. *Anatolia: An International Journal of Tourism and Hospitality Research*, 21(2), pp. 322-338.

Brida, J. G., Pulina, M., Riaño, E. M. M., and Zapata-Aguirre, S. (2010c). *Cruise visitors' intention to return as land tourists and recommend a visited destination: A structural equation model*. Social Science Research Network.

Brida, J. G., Bukstein, D., Garrido, N. and Tealde, E. (2010d). Cruise Passengers' Expenditure in the Caribbean Port of Call of Cartagena De Indias: A Cross-Section Data Analysis. *Estudios y Perspectivas en Turismo*, 19(5), pp. 607-634.

Brida, J. G., Pulina, M., Riaño, E. M. M., and Zapata-Aguirre, S. (2012). Cruise passengers' experience embarking in a Carribean home port. The case study of Cartagena de Indias. *Ocean and Coastal Management*, 55, pp. 135–145.

Chin, C. B. N. (2008). Cruising in the global economy: *Profits, pleasure and work at sea*. UK: Ashgate.

Cruise Lines International Association - CLIA. (2014). Statistics and Markets. http://www.cruising.org/docs/default-source/research/clia_europe_statistics_and_markets_2014.pdf?sfvrsn=2

Diakomihalis, M. (2006). *Marine tourism: the estimation of its impacts to the Greek economy via the tourism satellite account and its connection with the national accounting system*. PhD Thesis, (in Greek), University of the Aegean, Chios.

Dowling, R. K. (2006). *Cruise Ship Tourism*. UK: CABI.

Dowling, R. K., and Cowan, E., 2002, *Cruise Ship Tourism*, Wallingford, UK: CABI.

Duman T. and Mattila, A.S. (2005). The role of affective factors on perceived cruise vacation value. *Tourism Management,* 26(3), pp. 311–323.

Dwyer, L. and Forsyth, P. (1998). Economic Significance of Cruise Tourism. *Annals of Tourism Research*, 25(2), pp. 393-415.

Ellis, C. and Kriwoken, L. K. (2006). *Off the beaten track: A case study of expedition cruise ships in south-west Tasmania*. Australia, in Dowling, R. K., (eds), Cruise Ship Tourism, Oxfordshire: CABI, pp. 251-258.

Gabe, T., Lynch, C., McConnon, J. and Allen, T. (2003). *Economic Impact of cruise ship passengers in Bar Harbor, Maine*. Department of Resource Economics and Policy, University of Maine.

Gabe, T., Lynch, C. and McConnon J. (2006). Likelihood of Cruise Ship Passenger Return to a Visited Port: The Case of Bar Harbor, Maine. *Journal of Travel Research*, 44, pp. 281-287.

Gujarati, D. (2005). *Basic Econometrics*, 5th ed., New Delhi: McGraw Hill.

G.P Wild (Intenational) Ltd. (2012). *The Cruise Industry: Contribution of Cruise Tourism to the Economies of Europe*. Brussels, Belgium: European Cruise Council.

Hall, J.A., and Braithwaite, R. (1990). Caribbean cruise tourism: a business of transnational partnerships. *Tourism Management*, 11(4), pp. 339-347.

Henthorne, T. L. (2010). An Analysis of Expenditures by Cruise Ship Passengers in Jamaica. *Journal of Travel Research*, 38, pp. 246-250.

Hobson, J. S. P. (1993). Analysis of the US cruise line industry. *Tourism Management*, 13, pp. 453-462.

Hung, K., and Petrick, J. F. (2011). Why do you cruise? Exploring the motivations for taking cruise holidays, and the construction of a cruising motivation scale. *Tourism Management*, 32(2), pp. 386-393.

Johnson, D. (2002). Environmentally Sustainable Cruise Tourism: A Reality Check. *Marine Policy*, 26(4), pp. 261-270.

Klein, R. A. (2008). *Paradise lost at sea - Rethinking cruise vacations*. Halifax, Winnipeg: Fernwood Publishing.

Larsen, S., Wolff, K., Marnburg, E. and Øgaard, T. (2013). Belly full, purse closed: Cruise line passengers' expenditures. *Tourism Management Perspectives,* 6, pp. 142-148.

Lester, J. and Weeden, C. (2004). Stakeholders, the Natural Environment and the Future of Caribbean Cruise Tourism. *International Journal of Tourism Research*, 6(1), pp. 39-50.

Lin, V.S., Mao, R. and Song H. (2015). Tourism Expenditure Patterns in China. *Annals of Tourism Research*, 54, pp. 100-117.

Lois, P., Wang, J., Wall, A., and Ruxton, T. (2001). Fundamental Considerations of Competition at Sea and the Application of Cost-Benefit Analysis. *Tourism Today*, 1, pp. 89-102.

Lye, B.H. (2011). *What economic impact does cruise tourism have on the Stavangerregion?* (Unpublished Master thesis). Norwegian School of Hotel Management, University of Stavanger, Stavanger, Norway.

Olsen, M. (2012). *Butikkene kan takke cruise turistene for tre millioner kroner*. Stavanger Aftenblad. Retrieved from http://www.aftenbladet.no/nyheter/lokalt/%20stavanger/Butikkene-kan-takke-cruiseturistene-for-3-millioner-kroner-2942999.html

Orams, M. (1999). *Marine tourism: development, impacts and management*. London: Routledge.

Pantouvakis, A. and Patsiouras, C. (2016). *Tourists' Selection Criteria and Motivation. Does Nationality matter?*. SPOUDAI Journal of Economics and Business, 66(1-2), pp. 22-31.

Papadopoulou, G. and Sambracos, E. (2014). Recent Evolution of Cruise Activities in European Ports of Embarkation: A Quantitative and Economic Approach. *Archives of Economic History*, XXVI(1), pp. 7-26.

Papathanassis, A., and Beckmann, I. (2011). Assessing the 'poverty of cruise theory' hypothesis. *Annals of Tourism Research*, 38(1), pp. 153–174.

Peisley, T. (1992). *World Cruise Ship Industry in the 1990's*. Economist Intelligence Unit, London.

Petrick, J. F. (2005). Segmenting cruise passengers with price sensitivity. *Tourism Management*, 26, pp. 753–762.

Petrick, J.F. and Sirakaya, E. (2004). Segmenting Cruisers by Loyalty. *Annals of Tourism Research,* 31(2), pp. 472-475.

Piraeus Port Authority S.A. (2016). Traffic Statistics of the Cruise Industry. http://www.greekcruise.gr/index.php/port/cruisestatistics/49

Polydoropolou, A. and Litinas, N. (2007). Demand Models for Greek Passenger Shipping. *Research in Transportation Economics,* 21, pp. 297-322.

Raguž, I. V., Perucic, D. and Pavlic, I. (2012). Organization and Implementation of Integrated Management System Processes - Cruise Port Dubrovnik. *International Review of Management and Marketing*, 2(4), pp. 199-209.

Rodrigue, J.P. and Notteboom, T. (2012). The geography of cruises: Itineraries, not destinations. *Applied Geograghy*, 38, pp. 31-42.

Seidl, A., Guiliano, F. and Pratt, L. (2006). Cruise Tourism and Economic Development in Central America and the Caribbean: The case of Costa Rica. *Revista de Turismo y Patrimonio Cultural*, 4(2), pp. 213-224.

Sinclair, T. M. and Stabler, M. (1997). *The economics of tourism*. New York: Routledge.

Vina, L. and Ford, J. (1998). Economic impact of proposed cruise ship business. *Annals of Tourism Research*, 25, pp. 205-221.

Vogel, M. P. (2011). *Monopolies at sea: The role of onboard sales for the cruise industry's growth and profitability*. In A. Matias, P. Nijkamp, and M. Sarmento (Eds.), Tourism economics: Impact analysis (pp. 211–229). Heidelberg: Physica.

Weaver, A. (2005). The McDonaldization thesis and cruise shipping. *Annals of Tourism Research*, 32(2), pp. 346-366.

Wegrzynovski, R. (2007). *Turismo and Trabalho: Desvendando um setor socialmente importante*. Revista Desafios do Desenvolvimento.

Wild, P. and Dearing, J. (2000). Development of and prospects for cruising in Europe. *Maritime Policy and Management*, 27(4), pp. 315-337.

Wilkinson, P. (1999). Caribbean cruise tourism: Delusion? Illusion?. *Tourism Geographies*, 1, pp. 261-282.

Wood, R. E. (2000). Caribbean cruise tourism: globalization at sea. *Annals of Tourism Research*, 27(2), pp. 345-370.

ESTIMATING HOUSEHOLD DEMAND
FOR OLIVE OIL IN GREECE

IOANNA KOUNTOURI[a]
PRODROMOS PRODROMIDIS[b*]

[a]Athens University of Economics and Business, Greece
[b]Centre for Planning and Economic Research, and
Athens University of Economics and Business, Greece

Abstract

The paper estimates the monthly household demand for olive oil in Greece by econometrically analysing in a two-stage Heckman framework, cross-sectional microeconomic data solicited via the Household Budget Survey of 2011. It finds that quantity increases as (a) its price decreases, and (b) income or the quantity of seed oil, olive pomace oil, and margarine increase. Spatial, seasonal, and a couple of nationality (origin) effects are detected. Price elasticity is estimated at 1.5-1.7, which suggests that conditions are to some degree favourable towards the formation of a profit maximising monopoly exerting market power in Greece.

JEL Classification: C21, C24, D12
Key Words: Demand, Olive Oil, Substitute for Other Edible Oils and Fats, Greece, Sample Selection Correction

Corresponding Author: Pródromos Prodromídis KEPE, 11 Amerikis Str., Athens 153 42, Greece.
 E-mail: pjprodr@kepe.gr

Introduction

The paper estimates the monthly household demand for olive oil in Greece by econo-metrically analysing cross-sectional microeconomic data collected via a Household Budget Survey (HBS) in 2011. The survey was carried out by the Hellenic Statistical Authority (ELSTAT) on a representative sample of the population involving 3,515 private households with 7,429 members;[1] and according to the report released with the data, the (weighted) average monthly household consumption of olive oil in Greece was estimated at 3.5 litres (ELSTAT, 2013): one of the highest (actually, the highest) in the world (International Olive Council, 2012).

The finding is consistent with the product's role (a) as an integral element of the Greek (and the Mediterranean) diet since antiquity, and (b) in cultural and religious activities across Greece. Hence, as we shall see momentarily, its economics has become the subject of several studies.

The rest of the paper is organised as follows: Section 2 provides a literature review of recent studies regarding the supply and demand of olive oil in Greece. Section 3 describes the data employed in the analysis. Section 4 discusses relevant methodo-logical issues, and Sections 4 and 5, respectively, provide the empirical results and microeconomic implications of the analysis.

Brief Literature Review of Recent Sectoral and Market Studies

Recent studies (e.g., EU Commission, 2012; Skintzi, 2012; Mylonas *et al.*, 2015) have found that Greece is the third largest producer of olive oil in the world, following Spain and Italy. However, only a quarter of the product gets labelled/branded (compared with 50% in Spain and 80% in Italy), while the remainder is either consumed by producers themselves[2] or sold in bulk, mainly to Italy (from where it is exported) and, to a lesser extent, to local consumers. Indeed, the Greek public consumption of un-branded bulk olive oil is very high (75%), as opposed to branded products, compared to Italy (32%) and Spain (50%). The domestic olive oil value chain features (a) a multitude of olive groves, mills, refineries, bottling and labelling companies which,

---

1. Such surveys are carried out in all 28 EU member states, as well as Norway and three additional South-eastern European states (Montenegro, the Former Yugoslav Republic of Macedonia, Turkey), in order to (a) monitor population and social conditions within and across countries, and (b) calculate weights for the consumer price index. Eurostat collates and publishes the data every five years.

2. The 2011 HBS data analysed herein after reveal a high level of consumption by producers them-selves (estimated to about 13% in urban households and 42% in rural households in terms of quantity). The received wisdom is that many households that own olive groves –whether their members are professional farmers or not– keep a significant part of their production for themselves, relatives and friends.

by and large, are relatively small and not well integrated with other stages; (b) a fragmented producer cooperative structure which, on the whole, does not facilitate standardization of quality control; (c) short distribution channels, and (d) a retail sector dominated by a few large bottling and labelling companies that are said to be facing fresh competition from brands bottled by supermarket chains.

Distinct aspects have been studied by a number of analysts: Zafeiriou *et al.* (2012) employed FAO data from 1961- 2006[3] to look into production volatility of virgin olive oil in Greece and other major producing countries of the EU. Kizos and Vakoufaris (2009) employed administrative data from 2005-06 to look into producer characteristics and geographic indications used in Greece. Matsatsinis *et al.* (2007) and Vassiliou *et al.* (2008) described the Greek olive oil value chain, and interviewed millers, bottling operators, wholesalers, retailers, consumers and other stakeholders in 1997 and 2004-06, respectively, in order to establish the importance assigned by the said groups to the methods of production as well as to the quality, price, flavor, human health and other factors. Karipidis *et al.* (2005) considered a number of natural characteristics, production conditions, packaging, quality and other features of olive oil brands sold in retail shops in and around Athens and Thessaloniki during 2004, in order to explain price variation in the supply. Blery and Kapsopoulou (2007) and Blery and Sfetsiou (2008) described the marketing practices of the country's largest olive oil bottlers, namely, Elais-Unilever and Minerva-P.Z.Cussons.[4] Krystallis and Ness (2005) interviewed consumers from Athens and its environs in 2000 in order to establish purchasing profiles and to identify consumer segments. Chaniotakis *et al.* (2010) interviewed consumers in 2008 in order to look into the attitudes of those buying supermarket-brand olive oil. Vlontzos and Duquenne (2014) employed consumer survey data from 2009-10 to look into the factors which affect people's choices to purchase olive oil from the supermarket or from a friend/relative or consume their own production, and product features that affect people's willingness to pay 10 or 20% more or 10 or 20% less for a different olive oil product than the one they usually purchased. Lazaridis (2004) and Prodromídis (2011) employed, respectively, the 1993-4 and 2004-5 HBS data, to econometrically estimate, within a two stage Heckman model framework, the domestic demand for olive oil.[5]

---

3. The Food and Agriculture Organization is an agency of the United Nations.

4. To the extent they are both involved in the production and/or trade of many other goods (Elais in other oils, margarines, spreads, cooking cubes, fats, spices, sauces, soups, canned tomato products, frozen fish and chicken, meats, cereals, crème caramel, jelly, jams, syrups, ice cream, drinks, cleaning and personal care products; Minerva in other oils, margarines, spreads, cooking fats, cheese, yogurt, olives and vinegar), and, much like other olive oil sellers, merge their olive oil and other business figures in their financial accounts, a proper analysis of the sector's performance may be quite challenging.

5. Tsakiridou et al. (2006) also attempted to estimate a quasi-demand function using survey data from Thessaloniki and its environs. However, the data lacked price arguments and a sufficient number of quantities observed to allow for the proper execution of the second stage.

Data Description

Of the households surveyed in 2011, (a) 5.5% purchased olive oil, (b) 12.2% purchased seed or olive pomace oil (presumed substitutes in terms of monounsaturated fatty acids and cross price elasticities (e.g., Akbay, 2006; Serra-Majem *et al.*, 2013)), (c) 5.1% purchased both, (d) 25.8% purchased margarine, (e) 11.1% purchased olive oil and margarine, (f) 5.8% purchased all three (olive oil, seed or olive pomace oil, margarine), (g) 7.6% purchased other edible oils and fats (butter, cooking spreads, animal fats), (h) 5.0% purchased both olive oil and other edible oils and fats -slightly more than 0.6% purchased all four goods- and (i) 21.9% purchased no edible oils and fats.[6] Overall, olive oil constituted the largest item in the sample's monthly edible oils and fats food bill (averaging 5.9 litres at 4.3 euro per litre or 25.5 euro in terms of expenditure), and seed or olive pomace oil the second largest. Households that purchased olive oil generally possessed a smaller stock of olive oil in the kitchen cabinet (3.7 litres) compared to the sample surveyed (5.6 litres). They are also overrepresented in urban areas (esp. Thessaloniki, the largest city in northern Greece),[7] and are underrepresented in Peloponnese, the Ionian islands, and most of Northern Greece (the urban areas of Thessaloniki, Kastoria, Florina, Larisa and their immediate environs, excluded), and in terms of non-workforce participants and of native-born. On the other hand, these consumers' average income, household size and demographic composition are quite similar to those of the sample surveyed. In both cases, data collection was evenly distributed within the year. See Table 1.

Methodological Issues

Much like in the earlier studies carried out by Lazaridis (2004) and Prodromídis (2011), the analysis is complicated by the absence of expenditure figures pertaining to presumed substitutes (other edible oils and fats) and of reservation prices (i.e., the highest prices at which people would be willing to buy) in a good number of households (i.e., the presence of censored observations). This is common in household budget surveys considering that the emphasis is on spending, not on use.

---

6. Small differences between these numbers and the number of observations employed in certain probability functions considered in Table 2 arise when households with members born in Bulgaria and households located in Kastoria, Florina, Larisa or their environs are dropped, due to dependencies among the explanatory variables. Likewise, differences between the said numbers and the number of observations considered in the regressions supplied in Table 3 arise when households with Cypriot or Swedish members are dropped, due to dependencies among explanatory variables, and households with missing seed and olive pomace oil prices and missing inverse Mills ratios are dropped as well.
7. The data were provided at the local unit level, so in the analysis that follows outliers were easily singled out and the remaining observations were organised (grouped together) as per their consumption patterns, rather than the electoral or administrative division of the country (i.e., a customary sub-national partition that is probably irrelevant to the consumption issue at hand).

Understandably, the shorter the survey period and the more narrowly defined the commodity, the higher the proportion of households likely to report zero spending on the commodity.

As in the aforesaid studies, the issue is resolved via the employment of the two-stage Heckman procedure (Heckman, 1979). In our case, (a) the preparatory, first-stage (probit) equation concerning market participation takes into account household composition (by age-group and nationality), the size of the dwelling (a proxy for wealth), municipal and occupational dummies (see Table 2);[8] (b) the recovered sample selection correction variables (inverse Mills ratios) that capture the heterogeneity of uncensored observations compared to censored observations, are introduced in the second stage of the analysis, namely the estimation of demand function, alongside other explanatory variables. To deal with the restrictions posed on the size of the sample (and, hence, the degrees of freedom) by the censored (unknown) prices of other edible oils and fats purchased, we estimate two separate models: one that takes into account the impact of other oils and another that takes into account the impact of fats,[9] each in two versions: the standard one which considers the price impact of presumed substitutes (in which case many observations are censored), and another which considers the impact of their quantities (in which case observations can take the value of zero) and provides additional insights.[10]

Next, the quantity of olive oil which is demanded from the market is explained in terms of: (i) the price, (ii) the monthly income from paid work, pensions, unemployment and rent, benefits, transfers from other households, (iii) the price or quantity of other oils and fats, (iv) the available (unused) household stocks of olive oil (own production included), and (v) temporal and municipal dummies.[11] Crucially, not all explanatory variables considered in one stage are involved in the other stage.

---

8. Lazaridis (2004) considered the role of (a) the overall food bill, (b) the food bill percentage assigned to food prepared away from home, (c) family size, (d) a dummy for single or multi-person household, (e) quarterly and broad regional dummies, (f) the size of the population in the area, (g) the age, gender and formal education of the family head. Prodromídis (2011) considered the role of (i) family size and composition by gender, nationality, and age-group, (ii) monthly income, (iii) broad regional and bimonthly dummies, and (iv) the inverse Mills ratio for participation in the broad oils and fats market.

9. The consideration of both oils and fats in a single equation leads to a substantial loss of observations, and the consideration of prices associated with several conceivable substitutes and complements results in micronumerosity. In our view, to the extent that olive oil may be included in nearly every other cooking recipe in Greece, and it may also be excluded at times of fasting or used in ceremonies when no other food is involved, it is hard to think of it as a complement to a specific vegetable or meat dish.

10. In a basic sense, if a higher quantity of a substitute (complement) good is used, then a lower (higher) quantity of oil ought to be demanded (e.g., Parkin, 1989: 65).

11. Lazaridis (2004) considered the role of (a) price and of the prices of other edible oils and fats, (b) total expenditure on edible oils and fats, (c) the percentage of expenditure assigned to food prepared away from home, (c) family composition by age-group, (d) the population in the area,

Empirical Findings

The findings are supplied in Table 3. A good number of estimated coefficients is associated with positive or negative effects likely to be present (i.e., statistically different from zero) with a probability of error under or about 1%.

According to the results of the two typical demand functions and of the two variant expressions, the quantity demanded increases as price decreases, and is lower in the Athenian suburbs of Agios Dimitrios, Alimos, and Elliniko compared to Athens. (See columns 1-4, variables 21 and 13, respectively.) In addition, according to the results of the two variant expressions, quantity increases with family income[12] (as expected in the case of a normal good) and with the purchase of seed oil, olive pomace oil,[13] and margarine.[14] These oils and fats are goods for which someone might have expected olive oil to be a substitute, but then an increment in the amount of seed oil or margarine bought ought to bring about a reduction (rather than an increment) in the quantity of olive oil demanded. At the same time, demand appears to be lower during the vacation months of July and August compared to the rest of the year, and higher in the rest of continental Attica, Central Greece-Euboea, the Aegean islands (the islands of the Saronic Gulf and Crete included), and in households with members of Cypriot or Swedish origin.

Two Microeconomic Implications

The recovery of margarine and seed and olive pomace oil price coefficients statistically indistinguishable from zero (in Table 3, columns 3 and 1, variable 22), and, hence, the estimation of horizontal demands with respect to the prices of these goods (that is, a zero percent change in the quantity of olive oil in response to a change in each of these prices or zero cross elasticities of demand) is inconsistent with the role of

---

(e) quarterly dummies, (e) the age, gender and formal education of the family head. Prodromidis (2011) considered the role of (i) price, (ii) the quantities of other oils and fats purchased at the time or acquired by other means (own production included), (iii) the household stocks of olive oil and other edible oils and fats, (iv) family size and composition by gender, nationality, and age-group, (v) monthly income, (vi) broad regional and bimonthly dummies.

12. The recovered estimates associated with monthly income suggest so up to the rather high level of 3,370-3,532 euro per month. This is the result of the twice differentiated function with respect to monthly income. See columns 2 and 4, variables 19-20.

13. Up to the rather high level of 15.3 kg per month. As in the previous footnote, this is the result of the twice differentiated function with respect to the purchase of seed and olive pomace oil. See column 2, variables 22-23.

14. Up to the rather high level of 2.5 kg per month. As in the two previous footnotes, this is the result of the twice differentiated function with respect to the purchase of margarine. See column 4, variables 22-23. It seems that unlike the prices of the two goods, the quantities of the two goods have a non-linear effect on the quantity of olive oil demanded.

olive oil as their substitute. (The opposite cross elasticity, i.e., whether the said goods are substitutes for olive oil, is not studied here.) Interestingly, Lazaridis (2004) also reached a similar conclusion.

At the same time, the four olive oil (own) price elasticities of demand, E, at the average price and quantity are estimated to $|-1.8|, |-1.5|, |-1.6|$, and $|-1.5|$, respectively. All exceed the value of one. It follows that (a) a marginal reduction in price would increase sales, and (b) Lerner's index, equivalent to the inverse of E, is slightly or modestly above one half. As a result, conditions are to some degree favourable to collusion and the formation of a profit maximising monopoly exerting market power in Greece; so attention is drawn to the prospect of a bottleneck at the end of the olive oil value chain. It is noted that the range of price elasticities estimated here is close to the value of 1.3 estimated by Lazaridis (2004) on the basis of the 1993-4 data (collected, coincidently, at a time of a brief economic contraction) and much lower than the values of 2.9-3.1 estimated by Prodromídis (2011) on the basis of the 2004-5 data.

Finding an elastic demand and failing to classify olive oil as a substitute for certain goods is not necessarily inconsistent for two reasons: It does not mean that the said goods are not substitutes for olive oil. In a country with a long tradition of olive oil consumption by producers themselves, the true substitute for olive oil bought at the marketplace may well be olive oil made from one's own olives.

References

Akbay, C., 2006, "Urban Households' Cooking Oil and Fat Consumption Patterns in Turkey: Quality vs Quantity", *Quality & Quantity*, 41, 851-867.

Blery, E., and Kapsopoulou, K., 2007, "Marketing Olive Oil: A Case Study from Greece", *Journal of Food Products Marketing*, 13.4, 39-55.

Blery, E., and Sfetsiou, E., 2008, "Marketing olive oil in Greece", *British Food Journal*, 110.11, 1150-1162.

Chaniotakis, I.E., Lymperopoulos C., and Soureli, M., 2010, "Consumer's intentions of buying own-label premium food products", *Journal of Product & Brand Management,* 19.5, 327-334.

ELSTAT, 2013, *Household Budget Survey 2011*, Piraeus. (Press release of June 5th).

EU Commission, 2012. *Economic analysis of the olive sector*. Brussels. (Available on line via ec.europa.eu/agriculture/olive-oil/economic-analysis_en.pdf.).

Heckman, J.J., 1979, "Sample selection bias as a specification error", *Econometrica*, 47.1, 153-161.

International Olive Council, 2012, *Country Profile – Greece*, Madrid. (Available on line via http://www.internationaloliveoil.org/estaticos/view/136-country-profiles).

Karipidis, P., Tsakiridou, E., and Tabakis, N., 2005, "The Greek Olive Oil Market Structure", *Agricultural Economics Review*, 6.1, 64-72.

Kizos, T., and Vakoufaris, H., 2009, "Alternative agri-food geographies? Geographic indicators in Greece", *Tijdschrift voor Economische en Sociale Geografie*, 102.2, 220-235.

Krystallis, A., and Ness, M., 2005, "Consumer Preference for Quality Foods from a South European Persepective: A Conjoint Analysis Implementation on Greek Olive Oil", *International Food and Agribusiness management Review*, 8.2, 62-91.

Matsatsinis, N.F., Grigoroudis, E., and Samaras, A.P., 2007, "Comparing distributor's judgements to buyers' preferences", *International Journal of Retail and Distribution Management*, 35.5, 342-362.

Lazaridis, P., 2004, "Olive oil consumption in Greece: A microeconometric analysis", *Journal of Family and Economic Issues*, 25.3, 411-430.

Mylonas, P., Voumvaki, J., Koutouzou, A., Sakkas, G., and Zampeti, E., 2015, *Olive Oil: Establishing the Greek Brand*. Athens: National Bank of Greece.

Parkin, M., 1989, *Microeconomics,* Reading MA: Addison-Wesley.

Prodromídis, P.I., 2011, The Greek Market of Oils and Fats, with the emphasis placed on olive oil (in Greek), in K. Kanellopoulos (ed.) *Market Conditions and Competition in the Greek Economy*, vol. 1 of 3, Athens: KEPE, 131-184.

Serra-Majem, L., Ngo de la Cruz, J., Ribas, L., and Tur, J.A., 2003, "Olive oil and the Mediterranean diet: beyond the rhetoric." *European Journal of Clinical Nutrition,* 57, Suppl. 1, S2–S7.

Skintzi, G., 2012, "Presentation of the Greek olive oil bottling sector", *Greek Economic Outlook*, 19, 76-82.

Tsakiridou, E., Mattas, K., and Tzimitra-Kalogianni, I., 2006, "Influence of Consumer Characteristics and Attitudes on the Demand for Organic Olive Oil", *Journal of International Food & Agribusiness Marketing*, 18.3-4, 23-31.

Vassiliou, A., Kabourakis, E., and Papadopoulos, D., 2008, Traceability and Ethical Traceability in the Greek Olive Oil Chain, in C. Coff, D. Barling, M. Korthals, T. Nielsen *(*eds.) *Ethical Traceability and Communicating Food*. Dordrecht: Springer, 167-191.

Vlontzos, G., and Duquenne, M.N., 2014, *"Assess the impact of subjective norms of consumer's behavior in the Greek olive oil market", Journal of retailing and Consumer Service,* 21, 148-157.

Zafeiriou, E., Koutroumanidis, T., Kareklakis, C., and Trivellas. T., 2012. "The virgin olive oil production in Mediterranean basin: An empirical approach", *African Journal of Agricultural Research*, 7.43, 5734-5750.

Table 1. Description of the 2011 HBS sample and of the subsample of households that purchased olive oil (the figures concerning the subsample are supplied in parentheses)

3,515 (1,355) households involving 7,429 (2,950) members

Households that purchased			quantity (litres (L) /month)			price per L		
			mean	min	max	mean	min	max
Olive oil	1,355		5.89	1.09	36.95	4.32	2.19	7.30
Seed and olive pomace oil	810	(382)	4.57	2.17	43.47	2.20	1.06	6.00
Margarine	1,501	(593)	0.94	0.27	7.61	5.63	0.85	15.41
Butter	281	(118)	0.75	0.27	3.26	11.18	5.20	22.10
Cooking spread	166	(65)	1.02	0.33	2.61	5.21	2.17	12.01
Animal fats	8	(5)	0.92	0.54	1.74	9.58	4.71	13.54

Household features			mean	min	max	mean	min	max
Available stock of olive oil (in L)	1,813	(96)	5.64	0.25	451.39	(3.74)	(0.42)	(25)
Non zero monthly income (in €)	3,507	(1,353)	1,334.75	1	13,268	(1,301.34)	(1)	(9,823)
Size of domicile (in m^2)	3,515	(1,355)	84.74	12	450	(83.00)	(20)	(300)

Membership composition [a]			Members' residence (municipalities) [a]	
Males aged 0-11 years old	441	(190)	Athens	292 (131)
Females aged 0-11 years old	459	(218)	A.Dimitrios, Alimos, Ellinikon	34 (12)
Males aged 12-17 years old	277	(128)	Rest of Attica, C. Greece, Aegean Isl.	1,747 (699)
Females aged 12-17 years old	262	(116)	Thessaloniki and its environs	249 (174)
Males aged 18-81 years old	3,210	(1,290)	Kastoria, Florina and their environs	29 (21)
Females aged 18-84 year old	3,620	(1,432)	Larisa and its environs	52 (41)
Older folk	324	(104)	Rest of Greece	1,112 (277)

Members' origin (born in) [a]			Members by occupation (aged 15 years or older) [a]	
Greece	7,801	(2,932)	Farmer (cultivator)	46 (20)
Cyprus	10	(1)	Business professional [b]	125 (26)
Bulgaria	41	(30)	Other profession	3,016 (1,311)
Other neighbouring countries	101	(63)	Homemaker	1,193 (504)
Sweden	3	(3)	Unemployed	652 (319)
Elsewhere in the EU	44	(27)	Non workforce participant	2,397 (770)
Elsewhere in Europe	483	(353)		
Other places	110	(69)		

Households surveyed: April-June: 895 (359), July-August 620 (257), other months 2,000 (739).

Notes:
a The information is organized so as to describe elements featured in Tables 2 and 3.
b In finance, sales, management, market research, information technologies.

Table 2. Probability of participation in the edible oils & fats market based on the 2011 HBS

	Independent variables	Olive oil		Seed and olive pomace oil		Margarine	
1	Constant	-0.460	*	-1.005	*	-0.738	*
	Household membership						
2	Members aged 0-17 years old	0.651	o	0.056	o	0.162	*
3	Members age 18 years or older	0.024		0.134	*	0.156	*
4	Members born in Greece (ref.)						
5	Members born in Bulgaria	0.484	*	0.389	*	0.061	
6	Members born in Europe, non EU	0.308	*	0.125	*	0.095	*
7	Members born elsewhere	0.353	*	0.323	*	0.036	
8	Members occupied as homemakers	0.119	*	0.144	*	0.100	o
9	Members occupied as farmers	-0.380	*	-0.090		-0.206	
10	Members occupied as business prof.	0.114		0.079		-0.033	
11	Unemployed members	0.101	o	0.051		-0.056	
12	Others (ref.)						
	Residence						
13	Mun. of Kastoria, Florina environs	1.062	*	-0.177		0.063	
14	Mun. of Thessaloniki, environs	0.925	*	0.214	o	0.070	
15	Municipality of Larisa, environs	1.191	*	0.128		0.774	*
16	Rest of Greece (ref.)						
17	Size of domicile (in m^2)	-0.001	o	-0.002	o	0.001	o
	Pseudo R^2	7.25%		3.25%		3.02%	
	Observations (households)	3,515		3,515		3,515	

Note: Asterisks (circles) denote p-values ≤ 1% (between 1 and 5%).

Table 2 (continued)

	Independent variables	Butter		Cooking spread		Animal fats	
1	Constant	-1.834	*	-1.917	*	-3.271	*
	Household membership						
2	Members aged 0-17 years old	0.007		0.023		-0.105	
3	Members aged 18 years or older	0.131	*	0.116	º	-0.077	
4	Members born in Greece (ref.)						
5	Members born in Bulgaria			0.008			
6	Members born in Europe, non EU	-0.153	º	0.070		0.325	*
7	Members born elsewhere	0.024		-0.082		0.204	
8	Members occupied as homemakers	0.072		0.038		0.029	
9	Members occupied as farmers	-0.022		-0.089			
10	Members occupied as business prof.	0.698	*	0.271			
11	Unemployed members	-0.158		0.051		-0.232	º
12	Others (ref.)						
	Residence						
13	Mun. of Kastoria, Florina environs	-0.501		0.169			
14	Mun. of Thessaloniki, environs	0.172		0.146		0.250	
15	Municipality of Larisa, environs	0.239		0.248			
16	Rest of Greece (ref.)						
17	Size of domicile (in m^2)	0.002		-0.001		0.006	*
	Pseudo R^2	2.37%		1.44%		10.19%	
	Observations (households)	3,490		3,515		3,258	

Note: Asterisks (circles) denote p-values ≤ 1% (between 1 and 5%).

Table 3. Estimated OLS monthly demand for olive oil in Greece run with robust standard errors and based on the 2011 HBS (in milliliters)

	Independent variables	A: Considers the impact of seed & olive pomace oils, esp.		B: Considers the impact of margarine, esp.	
		the price	quantity	the price	quantity
1	Constant	12,941.84	13,176.09 *	17,095.11 º	12,324.08 *
	Household composition				
2	Males aged 0-11 y.o.	-715.86	-1,926.60 º	-2,206.34	-2,119,79 º
3	Males aged 12-81 y.o.	-437.42	-1,306.34	-1,336.18	-1,460.34
4	Females aged 0-84 y.o.	-1,288.01	-1,345.64	-2,106.30	-1,560.03
5	Others	-629.58	-1,278.66	-1,401.47	-1,439.32
6	Born in Greece (ref.)				
7	Born in Cyprus		11,169.19 *	9,430.53 º	10,236,47 *
8	Born in Sweden		13,384.06 *	11,745.83 º	13,295,48 *
9	Born elsewhere in EU	2,150.09	4,101.53 º	2,975.18	4,202,19 º
10	Born in other neighboring countries (incl. Bulgaria, rest of Europe)	3,076.77	3,204.00	2,182.62	3,477.09 º
11	Born elsewhere	2,963,39	3.321,31	2,591.98	3,646.09 º
	Residence				
12	Munic. Athens (ref.)				
13	Munic. of Ag. Dimitrios, Alimos, Ellinikon	-2,890.45 *	-1,567.84 *	-2,378.83 *	-1,621,50 *
14	Rest of Attica, C. Greece –Euboea, Aegean Isl.	37.59	1,176.20 *	1,475.00 *	1,122,47 *
15	Rest of Greece	-224.24	366.79	-87.78	349,91
	Months				
16	April-June	-444.74	-399.02	-978.98 *	-388,16
17	July-August	-548.01	-629.56 ▫	-765.40	-629,84 *
18	Other months (ref.)				
19	Monthly income (in €)	0.02	0.66 *	0.98 *	0,70 *
20	Monthly income squared	-0.00	-0.00 ▫	-0.00 *	-0.00 *
21	Price (in €)	-2,446,08 *	-2,023,96 *	-2,160,39 *	-2,023,84 *
22	Column variable	803,94 º	0.14 *	-53,717.57	1,15 *
23	Variable 22 squared		-0.00 *		-0,00 º
24	Available stock of olive oil	-0.13	-0.04	-0.12	-0,03

Sample selection correction

25	Olive oil	-2,539.68	-3,031.91		-2,127.76	-3,212.76	
26	Butter	-8,021.67	-8,848.15		-4,823.37	-9,421,68	*o*
27	Margarine	-8,479.95	-14,084.92		-16,997.17	-15,187.86	*o*
28	Cooking spread	-4,336.56	-4,236.49	*	-3,819.32	-4,335,20	*
29	Seed, olive pomace oil	13,971.03	14,664.50	*o*	11,186.07	15,543.24	*o*
30	Edible animal fats	6,126.44	7,722.18		6,764.64	8,459.54	*o*
R^2		24.77%	28.08%		30.11%	28.81%	
Observations (households)		354	1,236		524	1,236	

Regressions are estimated with robust standard errors to address issues of heterogeneity and lack of normality. Asterisks denote p-values ≤ 1.0%. Squares denote p-values between 1.0 and 1.1% and are used here in order to show that at a marginally higher p-value thereshold the findings of columns (2) and (4) are almost identical. Circles denote p-values between 1.1 and 5%.

THE REVENUE-EXPENDITURE NEXUS IN NIGERIA: ASYMMETRIC COINTEGRATION APPROACH

OLUMUYIWA GANIYU YINUSA[a*]
OLALEKAN BASHIR AWORINDE[b]
ISIAQ OLASUNKANMI OSENI[c]

[a, c]Olabisi Onabanjo University, Ogun State, Nigeria
[b]Tai Solarin University of Education, Ogun State, Nigeria

Abstract

The study revisits the revenue-expenditure nexus in Nigeria using the asymmetric cointegration methods to study four hypotheses related to the revenue and expenditure nexus, namely: tax-spend, spend-tax, fiscal synchronisation and institutional separation hypotheses for state and FCT government in Nigeria, between 1981 and 2014, using the Asymmetric Cointegration Technique. Results show the following; first, the Engle–Granger, Gregory and Hansen (1996) and the Hatemi-J (2008) cointegration tests along with the cointegration tests associated with the TAR and MTAR models indicate there is a long-run equilibrium relationship between aggregate state and FCT government revenue and expenditures. Second, the M-TAR model provides evidence of asymmetries in the adjustment process towards budgetary equilibrium. Third, state and FCT government revenue has a statistically significant impact on state and local government expenditure in the short run, thus supporting the tax-spend hypothesis for the state and FCT government in Nigeria. In sum, the results obtained indicate that it was the state and FCT government revenue that was driving expenditure in Nigeria.

Corresponding Author: Olumuyiwa Ganiyu, YINUSA, Department of Accounting, Banking & Finance, Olabisi Onabanjo University, Ago-Iwoye, Ogun State, PMB 2002 Ago-Iwoye Ogun State, Nigeria. E-mail: yinusa2016@gmail.com

1. Introduction

Empirical literature examining the revenue-expenditure nexus of the budget process has largely concentrated on the federal government level, while there are few studies examining the revenue-expenditure nexus at the state or local government levels. The few studies at the state level were largely centered on the United States; among them are those by Ram (1988), von Furstenburg *et al* (1995), Joulfaian and Mookerjee (1990), Zapf and Payne (2009) and Westerlund, Mahdavi and Firoozi (2011) with evidence supporting the four hypotheses in the revenue-expenditure literature. To the best of our knowledge, studies on the revenue-expenditure nexus in Nigeria have looked at the federal government level; this is why the main objective of our study is to examine the causality between revenues and expenditures at the Nigeria state and federal capital territory government level. The direction of causation is an empirical issue, although the majority of state governments operate under fiscal restrictions in the form of budget requirements and debt limits. These restrictions may infer tax-constrained spending decisions, the results of which are in conformity with the tax-spend hypothesis.

The study contributes to the existing tax-spend literature in the following ways: First, empirical evidence is based on state and federal capital territory government. Second, the study accounts for the fiscal imbalances witnessed during the structural adjustment programme of 1986. Third, the study examines the asymmetric cointegrating relationship in the budgetary process using the Enders and Siklos (2001) Threshold Autoregressive (TAR) and Momentum Threshold Autoregressive (M-TAR) cointegration frameworks. In particular, the study answers the following questions: (i) Is there a long-run equilibrium relationship between aggregate state and FCT government revenue and expenditures? (ii) Are there asymmetries in the adjustment process towards budgetary equilibrium? (iii) What is the relationship between revenue and expenditures in both the short and the long run?

Besides the introduction, this paper is divided into five more sections: Section two is the review of literature; Section three discusses the budgetary process in Nigeria; Section four centers on data and data sources; Section five discusses empirical results and findings, while the last section concludes the paper.

2. Literature Review

The theoretical relationship between public revenue and public expenditure can be explained by four main hypotheses in relevant literature: Institutional separation and fiscal synchronization hypotheses, spend-tax and tax-spend hypotheses. The first hypothesis is the fiscal synchronization hypothesis, which posits that the government's public revenue and spending decision to maximise the inter-temporal welfare of society is taken at the same time (Musgrave, 1966). The Government takes a joint spending and revenue decision in the budget at the same time; therefore, there

is bi-causality. However, a contrary view by the institutional separation hypothesis refuted the idea of fiscal synchronization. This hypothesis posits that public spending and public revenue decisions taken by the government are independent of each other. There is no inter-temporary causality between public revenue and public expenditure. The fiscal synchronization and institutional separation hypotheses have been challenged by the spend-tax and tax-spend hypotheses. The proponents of the spend-tax hypothesis are of the view that it is the expenditure that drives government tax decisions. The government first spends and then taxes later. But this view was later challenged by the position of the proponents of the tax-spend hypothesis. There were two competing views regarding the tax-spend hypothesis. The first view postulated by Friedman (1978) suggests that it is public revenue, such as taxes, that drives public expenditure. By implication, attempts to raise more revenue through taxes by the government increase rather than reduce fiscal deficits. However, Buchanan and Wagner (1977) are of a contrary opinion. They assert that tax increases can help reduce fiscal deficits provided this is combined with public spending reduction.

There is a plethora of empirical literature on the government revenue and expenditure nexus and the results could be classified into four strands, each supporting one of the four hypotheses explaining the revenue-expenditure nexus (Tax-Spend, Spend-Tax, Fiscal institutional separation and Fiscal synchronization hypotheses). One strand of studies supports Friedman's (1978) unidirectional causal relationship from public revenue to expenditure (Tax-Spend hypothesis). These studies include the works of Kollias and Makrydakis (2000) on Spain; Narayan (2005) on Indonesia, Singapore, Sri-Lanka and Nepal; Narayan and Narayan (2006) on Mauritius, El Salvador, Chile and Venezuela; Kollias and Paleologou (2006) on Italy and Spain; Afonso and Rault (2009) on Germany, Belgium, Austria, Finland and the UK, and on several EU New Member States; Ghartey (2009) on Kenya; Wolde-Rufael (2008) on Ethiopia, Ghana, Kenya, Nigeria, Mali and Zambia; Elyasi and Rahimi (2012) on Iran; Apergis, Payne and Saunoris (2012) on Greece; Mutascu (2016) on the Czech Republic, Hungary, and Slovenia.

The second strand of studies supports the Spend-Tax hypothesis, which posits unidirectional causality from expenditure to revenue. Indicatively, some empirical studies supporting this hypothesis are: Narayan and Narayan (2006) on Haiti; Kollias and Paleologou (2006) on Finland, France and the UK; Wolde-Rufael (2008) on Burkina-Faso; Afonso and Rault (2009) on Italy, France, Spain, Greece, and Portugal; Saysombath and Kyophilavong (2013) on Lao PDR and Mutascu (2016) on Bulgaria. The third strand supports the fiscal synchronization hypothesis (bi-directional causality). Empirical studies, such as those by Kollias and Paleologou (2006) on Denmark, Greece, Ireland, the Netherlands, Portugal and Sweden; Wolde-Rufael (2008) on Mauritius, Swaziland and Zimbabwe; Ghartey (2009) on South Africa and Nigeria; Aregbeyen and Insah (2013) on Nigeria and Ghana and Mutascu (2016) on the Slovak Republic, support this hypothesis.

The institutional separation hypothesis (no causality), which posits no causal relationship between public revenue and expenditure, has been supported by the empirical findings in the works of Kollias and Makrydakis (2000) on Portugal; Kollias and Paleologou (2006) on Austria, Belgium and Germany; Narayan and Narayan (2006) on Peru, South Africa, Guatemala, Uruguay and Ecuador; Wolde-Rufael, (2008) on Botswana, Burundi and Rwanda; Dada (2013) on Nigeria and Mutascu (2016) on Estonia, Latvia, Lithuania, Poland, and Romania.

In sum, studies in extant literature have employed different methodologies, such as cointegration, Granger causality, and panel estimators. Relevant studies covered a varied scope, but none of them specifically tested asymmetries in the expenditure revenue nexus while focusing on state collected revenue and expenditure. The majority of such studies, particularly concerning the context of Nigeria, centered on federally collected revenue and expenditure, without taking cognizance of asymmetries. This is the void filled by this study.

3. Budgetary Process in Nigeria

The budget process of the Federal government starts with the drafting stage, which begins with the articulation of government plans and vision for the economy. These plans are submitted to the Federal Ministry of Finance (hereinafter, FMOF) and coordinated by the Budget Office of the Federation (hereinafter, BOF). Government plans present, among others, details on how to boost economic growth through infrastructure provision, as well as poverty reduction and alleviation. The budget is based on the Medium-Term Fiscal Framework (MTFF) and reflects what the government projects concerning its revenue, expenditure, borrowing and fiscal balance. The revenue framework is a detailed government income statement prepared by the BOF. All Federal Government agencies that generate oil and non-oil revenue, submit their various income statements to the BOF, which collates and prepares the final document. The expenditure framework, similarly prepared by the BOF, presents details of the total sum the government plans to disburse. The process begins with the FMOF requesting Ministries, Departments and Agencies (MDA) to submit their budgets in form of a budget call circular.

After the entire sum of money to be spent has been determined, total expenditure is subtracted from total revenue to determine if this is a deficit or surplus budget case. If there is a budget deficit, the document gives detailed explanation on how the deficit is to be financed, either by borrowing or by printing money. In addition, if it is a surplus budget, the government explains how it will be utilised. In putting the budget together, the FMOF and BOF also introduce different stakeholders, such as the legislature – the National Assembly (hereinafter, NASS), the National Economic Council, the Organised Private Sector, Civic Society and the Public Sector - so that they may contribute during interactive sessions. After the preparation of the revenue and expenditure framework, the BOF makes a presentation to the Federal Executive Council (hereinafter, FEC) for consideration and approval. Once the FEC has approved the document, it is delivered to NASS, where it is considered and passed.

Following the drafting stage, comes the legislative approval. Upon presentation of the Appropriation Bill by the President to the NASS, the document is discussed by various committees of both the House of Representatives and the Senate. Committee recommendations are reviewed and organised by the Appropriation Committees of both Houses. Final recommendations are put forward by each House, in which the two bodies exchange views and then conclude, as each house passes the Appropriation Bill. If there are differences in their final figures of expenditure votes, the Senate and the House of Representatives meet to iron such differences out, before the final Bill is delivered to the President for his assent. He will then assent to the Appropriation Bill and by law, it becomes an Appropriation Act.

At the state level, it is the responsibility of the governor to submit the budget to the State House of Assembly. The revenue framework of the state government shows how revenue will be sourced and most state governments rely on revenue allocation by the federal government, with little internally generated revenue. The budget process commences with a call circular from the Director General of the Ministry of Budget and Planning to all state ministries, departments and agencies so that the latter may prepare estimates for the coming fiscal year. Subsequently, the commissioners in charge of each ministry prepare expenditure estimates in line with the goals and vision of the state. Expenditure estimates of the state are now submitted by each ministry and collated by the office of the Director General of Budget and Planning so that they may receive state executive council ratification and approval. After ratification by the state executive council, the executive governor presents the budget drafted to the state house of assembly for deliberations. Following thorough checking by the legislature and when all figures have been harmonised, the law makers will send the budget to the executive governor for his assent.

From the foregoing, it has been discovered that the budget process at both the federal and state government levels was somewhat similar, with the lawmakers being the major stakeholders in passing and implementing the budget. The major difference is that state governments heavily depend on federal government allocation to survive. In addition, the federal government budget is prepared and monitored for successful implementation by the BOF, while state government budgets are prepared by the Ministry of Budget and Planning and implemented by the commissioners appointed by the executive governors.

4. Data and Data Sources

This paper uses annual data from the Central Bank of Nigeria, Statistical Bulletins from the 1981-2014 period on total state and Federal Capital Territory[1] (hereinafter, FCT) government revenue and expenditure. To capture the effects of growth in the

---

1. The Federal Capital Territory (FCT) is the seat of power and also receives allocation from the federal government like state governments. Thus, all thirty-six states of the country, including the federal capital territory, receive about 24 per cent of federally generated revenue.
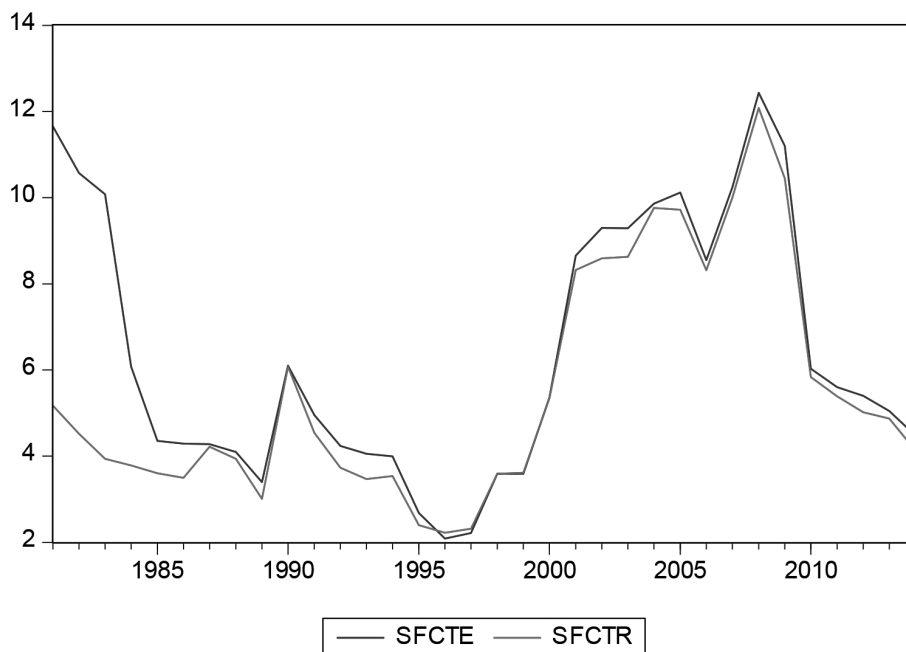
economy, state and FCT government revenue (SFCTR) and government expenditure (SFCTE) are expressed as a share of gross domestic product (GDP). A critical look at Figure 1 shows that state and FCT government expenditure is greater than government revenue in most cases. In the 1981-1985 period, there is a wide gap between government expenditure and revenue, and this is not unconnected to the end of the oil boom witnessed in the country. Before and during this period, government departments and agencies had embarked on white elephant projects, such as the Ajaokuta Steel Rolling Company, Jebba Sugar Company, etc., all of which are shadows of themselves. Coupled with this is the over-bloated wage bill of the government, which gave rise to the need for a call to reduce government activities; this culminated in the Structural Adjustment Programme (SAP) in Nigeria. The structural adjustment programme was conceived and born as a result of the debt crisis that struck most developing countries in the 1980s. The causes of the debt crisis in these countries are the following: the oil crisis of the 1970s, sloppy lending policies, increased interest rates in the United States, falling prices of commodities and large withdrawal of funds from indebted countries. The structural adjustment programme is a policy that places emphasis on the market system, as the main allocator of economic resources, and asks for lesser government participation.

The structural adjustment programme can be categorised into three major policy areas: First, foreign exchange with emphasis on currency devaluation, so as to deal with overvalued currencies, which generate an increase in import and domestic prices, as well as inflationary trends. Second, reduction in government spending with a focus on reducing budget deficits, as well as shifting economic activities and resources from the public to the private sector. Third, trade liberalisation and globalisation; emphasis is on the production of tradable over non-tradable goods, the purpose being to compete in international markets so as to resolve the debt crisis.

In sum, the structural adjustment programme represents deep economic and social changes amounting to: a) increasing productivity levels; b) eradicating government waste and inefficiency; c) achieving a higher degree of openness to foreign competition and integration in the global economy through trade and financial liberalisation, and d) achieving the objective of an acceptable level of economic growth and stability.

In addition, during the mid-1990s, government revenue and expenditure plunged to as low as 2 per cent, which is not unconnected with social unrest and protest that greeted the cancellation of the presidential election. However, government revenue and expenditure grew to about 12 per cent in the later period of 2000s. The major reason for this was the change in government from a military to a democratically elected government, which culminated in government size expansion. Furthermore, government expenditure and revenue fell immediately after 2008, and this is connected to the global financial crisis which hit most economies of the world.

Figure 1. Total State and Federal Capital Territory Government Revenues and Expenditures as a share of GDP 1981-2014

5. Estimation Strategy and Results

In order to examine the time series dynamics of state and FCT government revenues and expenditures in Nigeria, to differentiate between the four hypotheses related to the revenue-expenditure nexus and, also, to allow for the possibility of the existence of asymmetries in the budgetary process, we use the following steps in the estimation procedure:

Step 1 - We perform three standard unit root tests, namely the augmented Dickey–Fuller (ADF, 1979), the Phillips and Perron (PP, 1988), and the Ng-Perron (NP, 2001) on each series.

Step 2 - We proceed by examining the long-run relationship between revenues and expenditures only if individual series are found to be stationary at first difference [I(1)]. If no cointegration is found, we simply estimate an unrestricted vector autoregression (UVAR) model. If cointegration is found, then:

Step 3 - We utilise the adjusted threshold autoregressive (TAR) and momentum threshold autoregressive (MTAR) models, elaborated by Enders and Siklos (2001), as there could be some asymmetries in the adjustment process towards long-run equilibrium.

Step 4 - If TAR and MTAR cointegration is not found and the model is symmetric, we proceed with our analysis using a standard VECM. In the opposite case, and given there are asymmetries in the adjustment process towards the long-run equilibrium, we proceed with a threshold VECM.

5.1 Unit Root Test

The study begins the presentation of empirical results with the stationarity properties of the respective variables. The ADF, PP and the NP procedures test the null hypothesis of a unit root and the results from the ADF, PP and NP unit root tests are shown in Table 1 and indicate that state and FCT revenues and expenditures are non-stationary at levels, but at first differences.

Table 1. Unit Root Tests

Variable	ADF	PP	NP
SFCTR	-1.509	-1.687	-4.998
ΔSFCTR	-4.803***	-4.813***	-15.558***
SFCTE	-2.211	-2.301	-3.859
ΔSFCTE	-4.327***	-4.243***	-14.832***

Notes: In this paper, we use the test statistic MZt for the NP test. Proper lag length for each test was chosen by AIC.
  *** Indicates significance at the 1% level.
  ** Indicates significance at the 5% level.

5.2 Symmetric Cointegration Test

Given that revenues and expenditures are integrated at order one, the long-run relationship between state and FCT government revenues and expenditures is specified as:

$$SFCTR_t = \alpha_0 + \alpha_1 SFCTE_t + \varepsilon_t \tag{1}$$

where (SFCTR) is the state and FCT government revenue expressed as a percentage of GDP, SFCTE is the state and FCT government expenditure expressed as a percentage of GDP, α_0 to α_1 are parameters, and ε_t is the residual showing the disequilibrium between government revenue and expenditure. After performing the long-run linear regression in equation (1), the next step is to perform the unit root test on the residual series ε_t, which might be serially correlated and expressed as,

$$\Delta\hat{\varepsilon}_t = \rho\hat{\varepsilon}_{t-1} + \upsilon_t \tag{2}$$

where $\{\varepsilon_t\}$ contains regression residuals from equation (1) assumed to be purely white noise with a zero mean and constant variance and υ_t is an independent and identically distributed disturbance with a zero mean.

Table 2. Cointegration Test

Panel A: Engle-Granger Cointegration Test

Cointegrating Equation			ADF
$SFCTR_t =$ $0.879 +$	$0.723SFCTE_t$	$+$ $\hat{\varepsilon}_t$	
(1.404)	(8.180)***		-3.083**

Panel B: Gregory-Hansen and Hatemi-J Structural Breaks Cointegration Test

	ADF	Tb	Z_t^*	Tb
One Break	-6.593***	1990	-6.695***	1990
Two Breaks	-5.988*	1990, 2000	-6.792***	1990, 2000

Note: Engle-Granger refer to the non-cointegration tests advocated by Engle and Granger (1987), t-test are reported in parentheses. For the one -break test, the 1, 5 and 10 per cent critical values are -5.45, -4.99 and 4.72, respectively (Gregory and Hansen 1996). For the Two-break test, the corresponding 1, 5 and 10 per cent critical values are -6.50, -6.01 and -5.65 per cent, respectively (Hatemi-J 2008). The results are generated using the GAUSS10.0 software. The codes were obtained from Hansen's web page for the one-break test and from Hatemi-J for the two-break test. Tb denotes the structural break period.

    ***, ** and *indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A of Table 2 reports the test result for non-cointegration between government revenue and expenditure, which rejects the non-cointegration null at the 1% significance level. In Panel B, we checked for the possibility of potential structural breaks because of the behaviour of the government revenue and expenditure series using the Gregory and Hansen (1996) and the Hatemi-J (2008) cointegration tests based on structural breaks in the constant and linear trends. Results provide evidence of cointegration with the rejection of the null at the 1 percent level of significance and break dates correspond with major occurrences, such as the trade and financial liberalisation of the late 1980s, which transcends into the early 1990s. The second break date is in year 2000 and this corresponds with the change in government from a military to a civilian government. Since there is presence of cointegration in both the Engle-Granger cointegration test and the Gregory and Hansen (1996) and the Hatemi-J (2008) cointegration tests with structural breaks, the study proceeds to test for the presence of asymmetric cointegration.

5.3 Enders and Siklos (2001) Asymmetric Cointegration

Under the Engle-Granger cointegration test, the alternative hypothesis implicitly assumes the adjustment process is symmetric around the budgetary disequilibrium, i.e., $\varepsilon_t = 0$. However, if the adjustment in state and FCT government revenues and expenditures in response to budgetary disequilibrium is asymmetric, then the

symmetric adjustment process assumed in the error correction model represents a misspecification. In light of the possibility of an asymmetric adjustment process, the TAR and MTAR models of Enders and Silkos (2001) are examined as follow::;

The threshold autoregressive (TAR) model modification of the Engle and Granger (1987) test is given as

$$\Delta \hat{\varepsilon}_t = I_t \rho_1 \hat{\varepsilon}_{t-1} + (1 - I_t) \rho_2 \hat{\varepsilon}_{t-1} + \upsilon_t \tag{3}$$

where I_t is the Heaviside indicator, such that

$$I_t = \begin{cases} 1 \text{ if } \hat{\varepsilon}_{t-1} \geq \tau \\ 0 \text{ if } \hat{\varepsilon}_{t-1} < \tau \end{cases} \tag{4}$$

The M-TAR model of Enders and Siklos (2001) is of the form:

$$\Delta \hat{\varepsilon}_t = M_t \rho_1 \hat{\varepsilon}_{t-1} + (1 - M_t) \rho_2 \hat{\varepsilon}_{t-1} + \upsilon_t \tag{5}$$

Where M_t is the Heaviside indicator, such that

$$M_t = \begin{cases} 1 \text{ if } \Delta \hat{\varepsilon}_{t-1} \geq \tau \\ 0 \text{ if } \Delta \hat{\varepsilon}_{t-1} < \tau \end{cases} \tag{6}$$

where τ is the value of the threshold and endogenously determined using the Chan (1993) method. The Chan method arranges values $(\hat{\varepsilon}_t)$ and $(\Delta \hat{\varepsilon}_t)$ for the TAR and the M-TAR models, respectively, in ascending order, and excludes the lowest and the highest 15%, while τ is the consistent estimate yielding the lowest residual sum of squares over the remaining 70%. As stated by Petruccelli and Woolford (1984), the necessary conditions for the stationarity of $\hat{\varepsilon}_t$ are that $\rho_1 < 0, \rho_2 < 0$ and $(1 + \rho_1)(1 + \rho_2) < 1$.

Equations (3) and (4) express the TAR model and capture the response of the disequilibrium to positive and negative away from the threshold. If $\hat{\varepsilon}_{t-1}$ is above long-run equilibrium value, then adjustment is at the rate ρ_1 and, if $\hat{\varepsilon}_{t-1}$ is below long-run equilibrium value, then adjustment is at the rate ρ_2. The M-TAR model, expressed in equations (5) and (6), is useful when adjustment exhibits more momentum in one direction than the other; in other words, the speed of adjustment depends on whether $\Delta \hat{\varepsilon}_{t-1}$ is increasing or decreasing. Thus, differential effects of the positive against the negative phases of changes in budgetary disequilibrium could be examined using the MTAR model. If $|\rho_1| < |\rho_2|$, then increases in $\Delta \hat{\varepsilon}_{t-1}$ tend to persist, whereas decreases revert to the threshold quickly.

If the errors in equations (3) and (5) are serially correlated, equations (3) and (5) are replaced by

$$\Delta \hat{\varepsilon}_t = I_t \rho_1 \hat{\varepsilon}_{t-1} + (1 - I_t) \rho_2 \hat{\varepsilon}_{t-1} + \sum_{i=1}^{p} \beta_i \Delta \hat{\varepsilon}_{t-i} + \upsilon_t \tag{7}$$

$$\Delta\hat{\varepsilon}_t = M_t\rho_1\hat{\varepsilon}_{t-1} + (1 - M_t)\rho_2\hat{\varepsilon}_{t-1} + \sum_{i=1}^{p} \gamma_i\Delta\hat{\varepsilon}_{t-i}\, \upsilon_t \qquad (8)$$

Equation (7) is for the TAR model and equation (8) is for the M-TAR model. Enders and Siklos (2001) propose to implement the two sets of tests using the null hypothesis $H_0: \rho_1 = \rho_2 = 0$ for both the TAR and MTAR models. Here, the F-statistic does not follow a standard distribution and it is compared with the ϕ_u for the TAR model tables and the ϕ_u^* tables for the M-TAR model computed through Monte Carlo simulation by Enders and Siklos (2001). If the null hypothesis is rejected, that is, if cointegration is established, it is possible to test for asymmetric adjustment. The F-statistic for the null hypothesis of symmetric adjustment is $H_0: \rho_1 = \rho_2$, and this is compared to the standard F-distribution. Since there is no presumption as to whether to use the TAR or M-TAR model, the recommendation is to use the AIC or SBC to select the best adjustment mechanism.

Table 3. Estimates for Asymmetric Cointegration

Parameters	TAR Consistent (ϕ_u)	MTAR Consistent (ϕ_u^*)
ρ_1	-0.090(-0.697)	-0.048(-0.471)
ρ_2	-0.345(-3.720**)	-0.523(5.337***)
Tests		
$H_0: F(\rho_1 = \rho_2 = 0)$	7.14	14.45***
$H_0: F(\rho_1 = \rho_2)$	2.52	13.15***
Threshold τ	-0.565	0.550
AIC	78.72	69.42
H_0: no serial correlation $Q_{LB}(4)$	9.47(0.05)	3.877(0.42)

Note: Results are from the estimation of Eqs. (3) and (5) for state and FCT government revenue and expenditure. Critical values from Wane et al. (2004). ***, ** and * denote significance at the 1, 5 and 10 per cent levels, respectively.

Table 3 reports the asymmetric cointegration tests. In the second column of Table 3, we could not reject the null of no cointegration for the TAR model, because the F-statistic of 7.14 is less than the critical value of 7.70 at the 10 per cent significance level. Similarly, we could not reject the null of symmetric conitegration under the TAR model at the 10 per cent significance level. Column three of Table 2 reports the MTAR model. Here, the null of no cointegration was rejected, because the F-statistic of 14.45 is greater than the critical value of 13.23, at the 1 per cent significance level. The null of symmetric cointegration was rejected at the 1 per cent level of significance. Therefore, we accept the MTAR model, because we found evidence of

symmetric and asymmetric cointegration and subsequent interpretation is based on the MTAR model.

Given that $|\rho_1|$ is not stationary and that $|\rho_1|<|\rho_2|$ that is -0.048 is less that -0.523 in absolute terms in the MTAR model, the speed of adjustment is higher when the state and FCT budget is worsening than when the budget is improving. This result is consistent with Aworinde (2013) on Nigeria, Saunoris and Payne (2010) on the United Kingdom and Ewing *et al.* (2006) on the United States. Since cointegration between state and FCT government revenue and expenditure, as well as evidence of asymmetric adjustment under the MTAR model are established, then the asymmetric version of the error correction model (ECM) is given as:

$$\Delta SFCTR_t = \rho_{11} M_t \hat{\varepsilon}_{t-1} + \rho_{12}(1 - M_t)\hat{\varepsilon}_{t-1} + \sum_{i=1}^{p} \delta_k \Delta SFCTR_{t-i} + \sum_{i=1}^{p} \eta_k \Delta SFCTE_{t-i} + v_{it} \quad (9)$$

$$\Delta SFCTE_t = \rho_{21} M_t \hat{\varepsilon}_{t-1} + \rho_{22}(1 - M_t)\hat{\varepsilon}_{t-1} + \sum_{i=1}^{p} \delta_k \Delta SFCTE_{t-i} + \sum_{i=1}^{p} \eta_k \Delta SFCTR_{t-i} + v_{it} \quad (10)$$

Equations 9 and 10 represent the M-TAR model and they describe the dynamic relationship between state and FCT government revenue and expenditure by examining the speed of adjustment back to equilibrium. Parameters ρ_{it} represent the error correction coefficients. If there is a deviation from long-run equilibrium, and the deviation happens to be positive, depending on the Heaviside indicator, then the speed of adjustment is given by ρ_{11} and ρ_{21} in equations 9 and 10. Similarly, for negative deviations defined by the Heaviside indicator, the speed of adjustment is given by ρ_{12} and ρ_{22}.

5.4 Short-run Error Correction Model Results

Having established asymmetric cointegrating relationships between state and FCT government revenue and expenditure, we can now estimate the ECMs, as described in Equations (9) and (10), using the M-TAR; these results are reported in Table 4.

Firstly, any deviation from the long-run budgetary disequilibrium is corrected solely by movements in state and FCT government revenue and expenditure. This can be seen by the significance of the error correction parameter ρ_{12} in the ECM for state and FCT government revenue at the 1% level and parameter ρ_{21} in the ECM for state and FCT government expenditure at the 5% level. What it means is that, if state and FCT government revenue were below what is expected in long-run equilibrium, such an error is corrected in the next period by a fall in government revenue rather than by a change in government expenditure. On the other hand, if state and FCT government revenue were above what is expected in long-run equilibrium, such an error is corrected in the next period by a rise in government expenditure rather than by a change in government revenue.

It should also be noted that the estimates of ρ_{11} and ρ_{22} are insignificant in both cases, which reiterates the point that there is very little tendency for budgetary disequilibrium to change in order to restore equilibrium when government revenue is higher and when government expenditure is lower, since there is no pressure from the state and FCT government to intervene when expenditure is lower and revenue higher.

Table 4. Results for M-TAR Error Correction Models

Parameter	Dependent Variable ΔSFCTR	Parameter	Dependent Variable ΔSFCTE
ρ_{11}	0.113 (0.616)	ρ_{21}	-0.451 (-2.259)**
ρ_{12}	-3.437 (-3.780)***	ρ_{22}	-0.801 (-0.756)
ΔSFCTR(-1)	-0.292 (-0.829)	ΔSFCTR(-1)	0.222 (0.451)
ΔSFCTE(-1)	0.103 (0.347)	ΔSFCTE(-1)	-0.011 (-0.024)
Constant	0.228 (0.963)	Constant	-0.267 (-0.903)
$F_{5, 32}$	3.752**	$F_{5, 32}$	1.901

$F_{5, 32}$ is the overall F-statistic for the respective equations; t-statistics are reported in parentheses. Significance levels are denoted as follows: *** (1%), ** (5%) and * (10%).

In revenue equation 9, the F-statistic associated with state and FCT government expenditures, at the 5% level, have a statistically significant impact on state and FCT government in the short run. However, in expenditure equation 10, F-statistic is statistically insignificant, indicating that state and FCT government expenditures do not respond to budgetary disequilibrium with respect to state and local government revenue in the short run. These results lend support to the tax-spend hypothesis by Friedman (1978) concerning the state and FCT governments in Nigeria, which suggests that it is public revenue, such as taxes, that drives public expenditure. By implication, attempts by government to raise more revenue through taxes increases rather than reduces fiscal deficits. This finding aligns with similar findings in the works of Elyasi and Rahimi (2012), Wolde-Rufael (2008) and Magazzino (2013).

6. Conclusion

This study uses asymmetric cointegration methods to study four hypotheses related to the revenue and expenditure nexus: tax-spend, spend-tax, fiscal synchronisation and institutional separation hypotheses for state and FCT government in Nigeria; results have shed some interesting light on how government expenditure and revenue behave when they are above or below equilibrium. A major contribution to the

revenue and expenditure nexus literature is that the study considered the probability of asymmetric cointegrating relationship in the budgetary process using the Enders and Siklos (2001) TAR and M-TAR cointegration frameworks.

Study results show the following: first, the Engle–Granger cointegration test along with the cointegration tests associated with the TAR and MTAR models indicate there is a long-run equilibrium relationship between aggregate state and FCT government revenue and expenditures. Second, the M-TAR model provides evidence of asymmetries in the adjustment process towards budgetary equilibrium. Third, state and FCT government revenue have a statistically significant impact on state and local government expenditure in the short run, thus supporting the tax-spend hypothesis for the state and FCT government in Nigeria. In sum, the results obtained indicate that it was states and FCT government revenue that was driving expenditure in Nigeria. This is perhaps attributable to oil revenue dominance in Nigeria's government revenue profile and fiscal operations over time. In addition, state and FCT government in Nigeria should try to diversify into other sectors of the economy, such as agriculture and manufacturing, because of the volatility of oil prices and the fact that oil is a resource that is depletable. Future studies need to concentrate on each state government revenue and expenditure relationship, as relevant data become available.

References

Afonso, A., & Rault, C. (2009). Bootstrap Panel Granger-Causality between Government Spending and Revenue in the EU. *Economics Bulletin*, 29(4), 2542-48. Apergis, N., Payne, J. E., & Saunoris, J. W (2012). Tax-spend nexus in Greece: are there asymmetries? *Journal of Economic Studies*, 39(3), 327-336.

Aregbeyen, O., & Insah, B. (2013). A Dynamic Analysis of the Link between Public Expenditure and Public Revenue in Nigeria and Ghana. *Journal of Economics and Sustainable Development*, 4(4), 18-31.

Aworinde, O. B. (2013). The Tax-Spend Nexus in Nigeria: Evidence from Nonlinear Causality. *Economics Bulletin*, 33(4), 3117-30.

Buchanan, J., & Wagner, R. (1977). Dialogues Concerning Fiscal Region. *Journal of Monetary Economics*, 4, 627-36.

Chan, K. (1993). Consistency and Limiting Distribution of the Least Squares Estimator of a Threshold Autoregressive Model. *Annals of Statistics*, 21, 520-33.

Dada, M. A. (2013). Empirical Investigation of Government Expenditure and Revenue Nexus: Implication for Fiscal Sustainability in Nigeria. *Journal of Economics and Sustainable Development*, 4(9), 135-47.

Dickey, D. A., & Fuller, W. A, (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*, 74, 427-31.

Elyasi, Y., & Rahimi, M. (2012). The Causality between Government Revenue and Government Expenditure in Iran. *International Journal of Economic Sciences and Applied Research*, 1, 129-45.

Enders, W., & Silkos, P. (2001). Cointegration and Threshold Adjusment. *Journal of Business and Economics Statistics*, 19, 166-76.

Ewing, B. T., Payne, J. E., Thompson, M. A., & Al-Zoubi, O. M. (2006). Government Expenditures and Revenues: Evidence from Asymmetric Modeling. *Southern Economic Journal*, 73, 190-200.

Friedman, M. (1978). The Limitations of Tax Limitation. *Policy Review* (Summer), 7-14.

Ghartey, E. E. (2009). Cointegration and Causal Relationship between Taxes and Spending for Kenya, Nigeria and South Africa. *International Economic Journal*, 24(2), 267-82.

Gregory, A.W., & Hansen, B.E. (1996). Residual-based tests for cointegration in models with regime shifts. *Journal of Econometrics,* 70, 99–126.

Hatemi-J, A. (2008). Tests for cointegration with two unknown regime shifts with an application to financial market integration. *Empirical Economics,* 35, 497–505.

Joulfaian, D., & Mookerjee, R. (1990). Dynamics of Government Revenues and Expenditures in Industrial Economics. *Applied Economics*, 23, 1839-44.

Kollias, C., & Makraydakis, S. (2000). Tax and Spend or Spend and Tax? Empirical Evidence from Greece, Spain, Portugal, and Ireland. *Applied Economics*, 32, 533-46.

Kollias, C., & Paleologou, S. M. (2006). Fiscal Policy in the European Union: Tax and Spend, Spend and Tax, Fiscal Synchronization or Institutional Separation? *Journal of Economic Studies*, 33, 108-20.

Magazzino, C. (2013). Revenue and Expenditure Nexus: A case Study of ECOWAS. Open Assessment E-Journal, 1-27.

Musgrave, R. (1966). Principles of Budget Determination, in H. Cameron and W. Henderson (eds), *Public Finance*: Selected Readings, Random House, New York.

Mutascu, M (2016). Government Revenues and Expenditures in the East European Economies: A Bootstrap Panel Granger Causality Approach. *Eastern European Economics,* DOI: 10.1080/00128775.2016.1204237

Narayan, P. (2005). The Government Revenue and Government Expenditure Nexus: Empirical Evidence from Nine Asian Countries. *Journal Asian Economies*, 15, 1203-16.

Narayan, P., & Narayan, S. (2006). The Government Revenue and Government Expenditure Nexus: Empirical Evidence from Less Developing Countries. *Applied Economics*, 38, 285-91.

Ng, S., & Perron, P. (2001). Lag Length Selection and the Construction of Unit Root Tests with Good Size and Power. *Econometrica* 69, 1529-54.

Petruccelli, J. D., & Woolford, S. W. (1984). A Threshold AR(1) Model. *Journal of Applied Probability*, 21(2), 270-86.

Phillips, P. C. B., & Perron, P. (1988). Testing for Unit Root in Time Series Regression. *Biometrica*, 75, 335-46.

Ram, R. (1988). Additional Evidence on Causality between Government Revenue and Government Expenditure. *Southern Economic Journal*, 54, 763-69.

Saunoris, J. W., & Payne, J. E. (2010). Tax more or Spend less? Asymmetries in the UK Revenue-Expenditure Nexus. *Journal of Policy Modeling*, 32, 478-487.

Saysombath, P., & Kyophilavong, P. (2013). The Causal Link between Spending and Revenue: The Lao PDR. *International Journal of Economics and Finance*, 5(10), 111-119.

Wane, A., Gilbert, S., & Dibooglu, S. (2004). Critical Values of the Empirical F-distribution for Threshold, Calender Year 2004 Discussion Papers for the Department of Economics Southern Illinois University, Carbondale.

Westerlund, J., Mahdavi, S., & Firoozi, F. (2011). The tax-spending nexus: Evidence from a panel of US state–local governments. *Economic Modelling*, 28, 885-89.

Wolde-Rufael, Y. (2008). The Revenue-Expenditure Nexus: The Experience of 13 African Countries. *African Development Review*, 20(2), 273-83.

Zapf, M., & Payne, E. (2009). Asymmetric modelling of the revenue-expenditure nexus:evidence from aggregate state and local government in the US. *Applied Economics Letters*, 16(9), 871-876.

FINANCIAL AND HOUSING WEALTH EFFECTS ON PRIVATE CONSUMPTION: THE CASE OF GREECE

ERSI ATHANASSIOU[a]
EKATERINI TSOUMA[b*]
[ab]Centre of Planning and Economic Research (KEPE), Greece

Abstract

This paper investigates the effects of household wealth on consumption expenditure in Greece. Recognising the distinct and leading role of housing in the wealth portfolios of Greek households, we disentangle financial wealth effects from housing wealth effects, to assess the impact of these two wealth components separately. This type of analysis is being conducted for the first time for the case of Greece, and employs quarterly data for the time period 2000-2015, including a novel series on housing wealth constructed for the purpose of the paper. The results of the analysis point to the existence of a statistically significant cointegrating relationship between consumption and wealth, with positive financial and housing wealth effects in the long run. In the short run, both wealth components appear to play a role in determining consumption, with the effects of housing wealth being more pronounced.

JEL Classification: E21, C22
Keywords: Wealth Effects, Private Consumption, Cointegration, Greece

Corresponding Author: Dr. Ekaterini Tsouma, Centre of Planning and Economic Research (KEPE), 11 Amerikis Str. 106 72, Athens, Greece. E-mail: ekattsouma@gmail.com

1. Introduction

The effects of household wealth on private consumption have traditionally been analysed in the framework of the permanent income hypothesis (Friedman, 1957) and the life-cycle model (Modigliani and Brumberg, unpublished, Ando and Modigliani, 1963). In this framework, private consumption is determined by the current and expected future labour income stream of households, plus their stock of wealth. In recent years, the relationship between wealth and private consumption has attracted renewed attention, with the relevant literature often placing emphasis on the differentiation between financial and housing wealth effects. This revived interest on wealth effects has been motivated by major developments in financial and housing markets worldwide and their significant impact on the volume of household wealth in several countries.

The empirical literature on the effects of household wealth on consumption has focused mostly on the cases of the USA and other advanced economies. To the best of our knowledge, there are, thus far, no studies investigating these effects for Greece, despite the fact that the Greek case is very interesting for a number of reasons. Considering the period from 2000 onwards, private consumption in Greece has persistently accounted for a particularly high share of the GDP and has played a far more decisive role in shaping GDP rates of change, compared to other European economies. In addition, changing conditions in financial and housing markets and their implications for household wealth have been rather dramatic in the Greek economy. Housing investment and prices progressed from an era of boom, up until 2008, to an era of unprecedented decline thereafter, and the ASE General Index underwent major shocks both prior to and in the course of the country's economic crisis. Furthermore, out of the two main household wealth components, housing has historically maintained a distinct and leading role in the wealth portfolios of Greek households, with major shifts in housing investment and prices inducing substantial changes in this role during the period under examination.

The considerations described above provide a clear motivation for investigating the relationship between household wealth developments and private consumption in Greece, as well as a strong incentive for attempting to disentangle housing from financial wealth effects in the Greek case. Importantly, in the current conjuncture, with Greece striving to overcome recessionary conditions and progress into an era of recovery and sustainable growth, the study of how consumption and wealth developments interact may provide useful insights with reference to the prospects of the economy. Moreover, the findings of such an analysis may contribute to the design of economic policies conducive to long-term viable growth.

In this framework, the objective of the present paper is to investigate the effects of household wealth on private consumption expenditure in Greece, with a focus on disentangling financial wealth effects from housing wealth effects, to separately

assess the impact of these two wealth components. This type of analysis is being conducted for the first time for the Greek case, and contributes both to the general empirical literature on wealth effects on consumption, and to the more recent body of studies examining the determinants and prospects of domestic demand in Greece.

The dataset used in our analysis covers the period from 2000Q1 to 2015Q3, and includes a novel quarterly series on household wealth in Greece, as well as publicly available data on private consumption expenditure, financial wealth, and income variables. The new housing wealth series has been constructed for the purpose of this paper, in order to overcome data availability constraints, which represented a fundamental cause for the lack of prior evidence on the Greek case. The derivation of the housing wealth series constitutes one of the main contributions of our paper and is crucial for the analysis conducted, since it is necessary for the calculation of a total household wealth series and the disentanglement of financial wealth effects from housing wealth effects.

Our empirical analysis applies a two-step empirical procedure, examining both the long and the short-run relationship between consumption and wealth through a cointegration and error correction model methodology. The results are in favour of the existence of a positive and statistically significant cointegrating relationship between consumption and wealth, with positive financial and housing wealth effects in the long run. In the short run, both wealth components play a role in determining consumption, with the effect of financial wealth being, however, less pronounced as compared to that of housing wealth.

The paper is organised as follows. Section 2 provides the theoretical background and reviews the relevant empirical literature. Section 3 discusses major developments in private consumption, as well as housing and financial wealth in Greece, and explains the construction of the housing wealth series. Section 4 outlines the empirical methodology applied in the analysis and presents the data employed. Section 5 reports the empirical results, and section 6 summarises the conclusions and policy implications of our paper.

2. Theoretical Background and Empirical Evidence

The analysis of the relationship between private consumption and wealth, and, more particularly, of the effects of wealth on consumption, is directly related to the framework of the permanent income hypothesis and the life-cycle model. According to Ando and Modigliani (1963), Friedman's permanent income hypothesis, even though well suited for testing against cross-section data, does not generate the type of hypotheses to be easily tested against time series data. As they indicate, almost contemporaneously with Friedman's work, Modigliani and Brumberg (unpublished) 'developed a theory of consumer expenditure based on considerations relating to the life-cycle of income and of consumption needs of households'. Modigliani and Brumberg also attempted to derive time series implications of their hypothesis.

In the life-cycle model, the utility of the individual consumer is assumed to be a function of his own aggregate consumption in current and future periods. It is maximised subject to resources available, these being the sum of current and discounted future earnings over his lifetime and current net worth. As a result, the individual's current consumption can be expressed as a function of his resources and the rate of return on capital, with parameters depending on age. To obtain the aggregate consumption function over all individuals, the individual functions are aggregated. In deriving the aggregate consumption function, assumptions relating to the characteristics of the individual's utility function and the age structure of the population are most crucial.

According to the model described above, the individual's consumption, c_t^T, is given by:

$$c_t^T = \omega_t^T y_t^T + \omega_t^T (N - T) y_t^{eT} + \omega_t^T a_{t-1}^T \tag{1}$$

where y_t^T is current non-property income, y_t^{eT} is the average annual expected income (T stands for the age of the individual and N denotes the earning span) and a_{t-1}^T is the current sum of net worth, carried over from the previous period. To obtain aggregate consumption, under specific assumptions, equation (1) is aggregated within each age group and over the age groups, resulting in:

$$C_t = \alpha_1' Y_t + \alpha_2' Y_t^e + \alpha_3' A_{t-1} \tag{2}$$

In their empirical least-squares approach applied to a single equation, and when applying first differences, Ando and Modigliani obtained a highly significant coefficient estimate of net worth. Overall, they concluded that tests seemed to support the hypothesis of the importance of net worth as a determinant of consumption.

Since the above contributions, a growing body of empirical literature has dealt with the examination of wealth effects on consumption.[1] A significant part of the relevant literature applies the cointegration and error correction model methodology to investigate the long and short-run relationship between wealth and consumption. The connection between the theoretical background and the cointegration applications is provided by Lettau and Ludvigson (2001) who note that (the logs of) aggregate consumption, asset holdings and labour income share a common long-term trend,

---

1. The relevant empirical applications employ either macroeconomic or microeconomic data. Since, the present application follows the lines of similar empirical studies based on macroeconomic data, here we will not review the micro data literature. Carroll *et al.* (2011) offer a helpful review of that branch of the literature and also point to the heterogeneity characterizing the related work. Of relevance are also certain studies focusing on the role of credit conditions and the credit channel (see e.g. Iacoviello, 2004; Muellbauer, 2007; Musso *et al.*, 2011).

they are cointegrated, but may still substantially deviate from one another in the short run. This argument is derived on the basis of their definition of aggregate wealth (human capital plus asset holdings), and the work of Campbell and Mankiw (1989), showing that, if the consumption-aggregate wealth ratio is stationary, then the budget constraint may be approximated by taking a first-order Taylor expansion of the wealth accumulation equation.

Addressing net worth and total wealth, does not necessarily involve a distinction between different kinds of assets, and, hence, different wealth components. It might be expected from theory that the effects of financial and real, and, more specifically, housing wealth on consumption should be similar (Dvornak and Kohler, 2007). However, there are several reasons in favour of the argument that the responsiveness of consumers to different types of wealth may well be different. Such reasons include differences in liquidity, other utility associated with owning an asset (e.g. housing services, bequest motives), distribution across income groups, expected permanency of changes, mismeasurement of wealth and psychological factors (see e.g. Dvornak and Kohler, 2007, Dreger and Reimers, 2012, Guo and Hardin, 2014, Galli, 2016).

In the earlier empirical literature investigating wealth effects on consumption, one can distinguish between contributions not disentangling between financial and real/housing wealth and those focusing solely on financial wealth. However, more recent applications place emphasis on differentiating between financial and real (housing) wealth effects.

Overall, and even though the relevant literature is vast and underlying applications diverge in a number of terms (e.g. varying magnitudes of estimated effects, different estimation procedures applied, different time periods but also different sources for the derivation of financial and real wealth data), a considerable number of papers conclude that total wealth plays an important role in shaping consumption, but also detect significant individual effects brought about by either financial or housing wealth or both.

As can be expected, the majority of the relevant empirical applications refer to the cases of the USA, as, for example, Poterba (2000), Benjamin *et al.* (2004), Case *et al.* (2011) Carroll *et al.* (2011), and Bampinas *et al.* (2017), who all detect significant wealth effects. Similar applications for the USA with different points of emphasis include Lettau and Ludvigson (2004), who state that a surprisingly small fraction of the variation in household net worth is related to the variation in aggregate consumer spending, Guo and Hardin (2014), who focus on the relative composition of wealth, Holmes and Shen (2014), who investigate the effects of volatility on the wealth-to-income ratio, and Christelis *et al.* (2014), who investigate the effects of wealth shocks during the Great Recession. There is also a significant number of papers referring to other advanced individual economies, such as Barrell *et al.* (2003) and Márquez *et al.* (2013) for the case of the UK, Pichette and Tremblay (2003) for Canada, Tang

(2006), Dvornak and Kohler (2007) and Fisher *et al.* (2010) for Australia, Bassanetti and Zollino (2010) and Botazzi (2013) for Italy, Chauvin and Damette (2010) for France, Navarro and de Frutos (2015) and Sastre and Fernández (2010) for Spain, Hamburg *et al.* (2008) for Germany, Edelstein and Lum (2004) for Singapore, and Jansen (2010) for Norway, who all detect significant effects. In addition, varying evidence with reference to the significance of the effects is provided, for example, by Schmid (2013) on Switzerland, who detects a significant effect only in the long run, Galli (2016) on Switzerland, who does not detect significant effects when using the entire sample, but also notices some robustness issues, and O'Donnell (2007) on Ireland, who does not detect clear wealth effects.

Furthermore, a number of studies refer to country groups and incorporate panel analysis, such as Jaramillo and Chailloux (2015) and Shen *et al.* (2015). According to Labhard *et al.* (2005), there should be little theoretical rationale for wide dispersion in the marginal propensities to consume (MPCs). They provide evidence on a common long-run marginal MPC across 11 OECD countries, and argue that, in cases detected, the differences observed may, in fact, reflect difficulties in measuring wealth across countries and also a failure to take into account shocks causing changes in both consumption and wealth. Still, in most cases of studies investigating country groups, the evidence derived is mixed and significant differences are revealed. Such examples include Girouard and Blondal (2001) and Boone and Girouard (2002), who examine the G7 group (except Germany), Bertraut (2002) investigating 10 countries, Bayoumi and Edison (2003) estimating panel regressions for 16 advanced economies, Byrne and Davis (2003) for the G7 countries, Catte *et al.* (2004) studying 10 OECD countries, Case *et al.* (2005) relying on a panel of 14 OECD countries and a panel of US states, Dreger and Reimers (2006) examining a panel of EU countries, Aron *et al.* (2006) using data for the UK and South Africa, Slacalek (2009) investigating wealth effects at the country-level for various country groups and for 16 countries, Skudelny (2009) using two different euro area data sets for 8 countries, excluding Ireland, Luxemburg, Greece and Portugal, due to data availability restrictions, Kerdrain (2011) for the US, Japan and the Euro area, including Greece, De Bonis and Silvestrini (2012) using data for 11 OECD countries, Šonje *et al.* (2012) for four European post-transition economies, Šonje *et al.* (2014) for a group of 30 developed and emerging economies using different panels, and Barrell *et al.* (2015) for the UK and Italy. Note that, most often, varying results across the countries investigated are attributed to differing characteristics with respect to financial as well as housing and mortgage markets. For example, in countries such as the UK and the USA, the mechanism of housing equity withdrawal[2] appears to operate more strongly as compared to the cases of most European countries. The latter also seem to have more

---

2. Housing equity withdrawal is new borrowing secured on dwellings that is not invested in the housing market (i.e. not used for house purchase or home improvements). For explicit reference to housing equity withdrawal, see, e.g., Girouard and Blöndal (2001) and Boone and Girouard (2002).

traditional bank-oriented structures and/or less deep financial markets, as compared to Anglo-Saxon economies (see e.g. Slacalek, 2009, De Bonis and Silvestrini, 2012).

Finally, there is a small number of studies conducted on a regional or state basis, while references to developing or emerging economies are scarce (Saad, 2011, for Lebanon, detects significant wealth effects; Ciarlone, 2011, for 17 emerging economies, detects partly significant wealth effects; Peltonen *et al.*, 2012, for 14 emerging economies, detect and outline differences among countries investigated). As noted earlier, for the case of Greece, and to the best of our knowledge, there exists no evidence on the potential effects of wealth on consumption on an individual country basis.

3. Major Developments in Consumption and Wealth and a Novel Housing Wealth Series

As mentioned earlier, the study of wealth effects on consumption assumes particular interest in the case of Greece, one reason being the crucial role of consumption in shaping developments in the Greek GDP. As illustrated in Figure 1, private consumption has persistently accounted for a particularly high share of economic activity in Greece, amounting to 70.3% of the GDP in 2015, versus 56.5% of the GDP on average in the EU28. Moreover, private consumption has over time maintained a decisive contribution to the country's rate of change of the GDP, representing the leading force behind the GDP rise over the 2000-2007 period, but also a key driver of the GDP downfall over the subsequent period of recession.

Figure 1. Share of private consumption in the GDP in Greece and the EU28, and contribution to the rate of change of the GDP in Greece
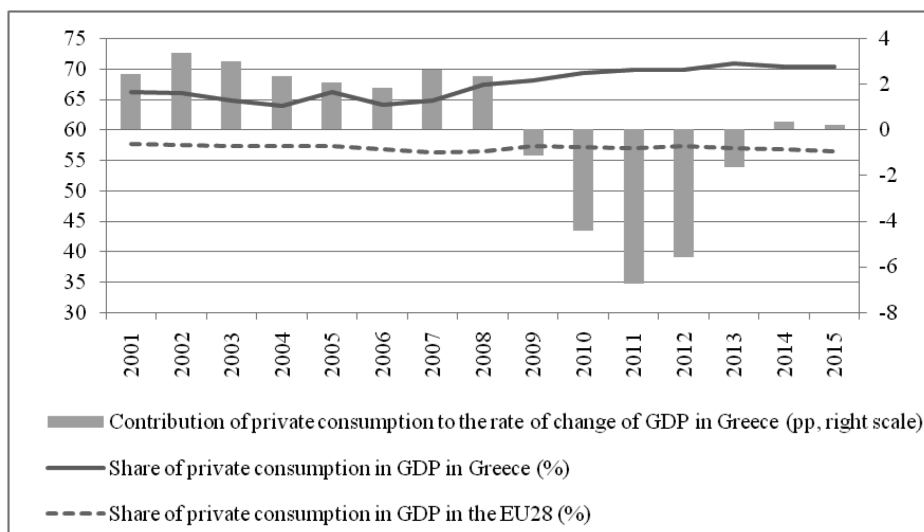

Sources: ELSTAT, Eurostat and authors' calculations.

Some preliminary indications of a possible significant role of wealth effects on private consumption in Greece are provided by the particularly pronounced changes in the country's housing and financial market conditions from 2000 onwards.

With respect to developments in the housing market, prior to the crisis, households invested heavily in housing, being encouraged by ample availability of credit, low interest rates and booming house prices (Figure 2). Investment in dwellings reached 41.6% of total gross fixed capital formation in Greece in 2007, from 36.4% in 2000, with the corresponding Euro Area averages amounting to 29.2% and 26.8%, respectively, according to Eurostat National Accounts data. Furthermore, indicatively, urban area house prices in Greece increased by 97.0% between 2000Q1 and 2007Q4, according to the relevant index of the Bank of Greece. This era of boom in housing investment and prices was followed by an era of unprecedented decline in the course of the crisis. From 2008 onwards, housing investment declined dramatically to reach a mere 6.6% of total investment by 2015, while house prices also experienced a persistent major downfall, with the urban house price index decreasing by -41.9% between 2008Q4 and 2015Q4.

Figure 2. ASE General Index, gross fixed capital formation in dwellings and index of house prices
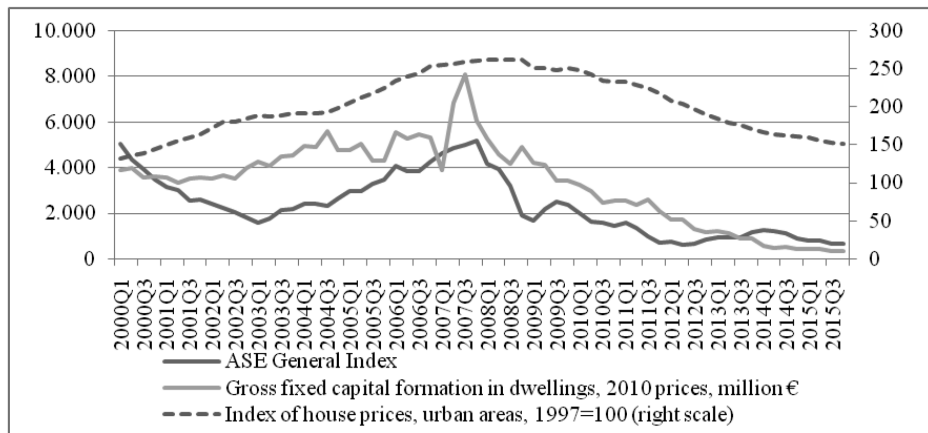
Sources: ELSTAT, Bank of Greece.

Concerning developments in the financial market, the ASE General Index went through major fluctuations up to 2008, entering a prolonged period of low performance thereafter. Furthermore, household deposits in domestic banks more than doubled between 2004 and 2009, but experienced heavy downward shocks afterwards, reflecting mainly a flight of funds in periods of escalating crisis conditions.

Further indications about the possible role of wealth effects on private consumption in Greece are provided by the very evolution of housing and financial wealth of Greek households, which is, of course, related to the market developments just mentioned.

With respect to housing wealth, dwellings have historically represented a primary wealth component for Greek households, being, until relatively recently, perceived as a safe form of investment, with significant potential long-term returns from the rise in real estate values. However, in the case of Greece, there are no official housing wealth data available. The lack of housing wealth data is a common problem in studies of the effects of household wealth on consumption. The way this problem has been resolved in the literature is via the construction of the housing wealth series (see e.g. Skudelny 2009, Slacalek 2009, Case *et al.* 2005) using other appropriate data, such as, for example, data on residential property prices, the dwelling stock and/or investment in dwellings.

Following a similar approach, in the present paper we construct a housing wealth data series for the Greek economy. The new series is based on (a) data for the housing stock (age and total surface in m^2), obtained from the published results of the 2011 census performed by the Hellenic Statistical Authority (ELSTAT), (b) data on private building activity on the basis of building permits issued, available in m^2 on a monthly basis from ELSTAT, (c) the index of prices of dwellings (historical series), available on a quarterly basis from the Bank of Greece, (d) the average price of new apartments sold in 2009Q1 per m^2 (Mitrakos, 2009) and (e) the assumption of a yearly depreciation rate of 1.3%, which is consistent with the range of housing depreciation rates reported in the literature and employed by statistical agencies in various countries (see, e.g., Bokhari and Geltner, 2014; Kostenbauer, 2001).

To construct the housing wealth series we take the total surface and age of housing from the 2011 census and use the depreciation rate to obtain a measurement of the total housing stock in 2011Q1 expressed in equivalents of new housing in m^2. Taking this measurement as a basis, we then use data on private building activity in m^2 and the depreciation rate to compile a quarterly series of the housing stock expressed in equivalents of new housing in m^2, assuming a period of two years from permit issuance to construction completion. Having, thus, obtained a housing stock series, we then use the index of prices of dwellings and the average price per m^2 in 2009Q1 to derive the housing wealth series in nominal terms. Finally, to obtain net housing wealth, we subtract mortgage debt (Bank of Greece data) from housing wealth.

Figure 3 displays the net housing wealth series constructed using this methodology, together with the corresponding series on private consumption (consumption of households and non-profit institutions serving households (NPISH)). As shown in this figure, housing wealth developments have followed a very similar trend with corresponding developments in private consumption, thus providing indications of possible significant wealth effects on consumption. More particularly, housing wealth

increased rapidly up to the beginning of 2008, as a result of high investment in new housing and increasing house prices. During the same period, private consumption followed a similar pattern, decisively contributing to GDP growth in Greece. From the beginning of 2010 onwards, housing wealth has followed a downward trend, as a sharp decline in housing investment coincided with continuous downfall in house prices. In parallel, private consumption contracted sharply, representing one of the main drivers of the recession in the country.

Figure 3. Private consumption and net housing wealth in Greece (billion €)
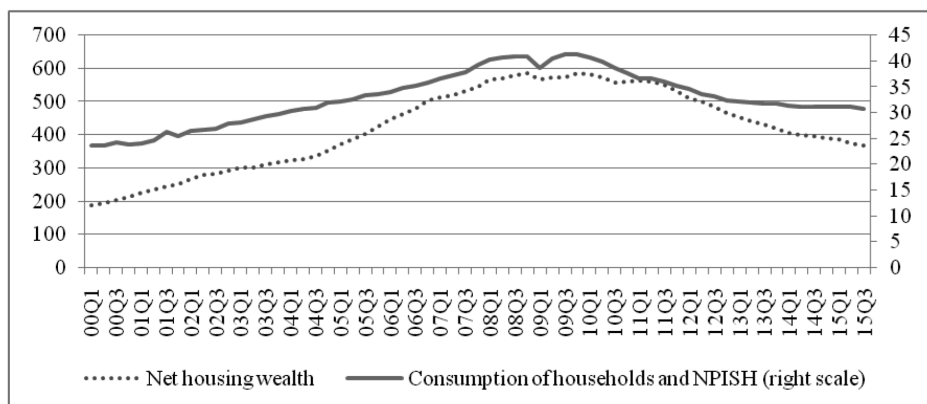
Sources: ELSTAT, Bank of Greece, authors' calculations.

Turning to financial wealth, available official data on financial assets and liabilities of households allow for the calculation of a net financial wealth series, illustrated in Figure 4. As it appears, on the basis of this series, household financial wealth seems to exhibit a higher degree of volatility compared to housing wealth and private consumption. Furthermore, while there have been extended periods where developments in financial wealth have been in the same direction as developments in consumption, there have also been periods with diverging developments. For example, from the second half of 2012 until the first quarter of 2014, consumption kept declining, but financial wealth appeared to recover due to the increase in the value of equity in a period of rising ASE General Index.

Figure 4. Net financial wealth in Greece (billion €)

Source: ELSTAT.

The addition of the net financial wealth series above to our novel net housing wealth series yields a net total household wealth series for the Greek economy. Notably, on the basis of our calculations, the share of housing wealth in total wealth amounted to 60% in 2002 in Greece, versus an average of 57% for the Euro Area as a whole and a range between 40% and 68% in various individual countries, respectively (Skudelny 2009). Furthermore, the ratio of financial and housing wealth to the annual compensation of employees in Greece in the same year was equal to 8.3 according to our data, being thus very close to the corresponding ratios reported by Slacalek (2009) for Italy, Spain, France and the UK. These observations indicate that, even when moving further away from the year 2011, for which we have an official estimate of the housing stock on the basis of the census, our calculations produce reasonable results with respect to the size of household wealth in Greece.

Finally, concerning the weight of housing in the portfolios of Greek households, it is worth noting that the share of net housing wealth to net total wealth in Greece increased from 41.9% in 2000 to 68.8% in 2008, the latter figure being particularly high by European standards. Furthermore, despite the major decline in housing investment and house prices in the course of the crisis, housing continues to represent the largest component of household wealth in Greece, with net housing wealth equalling 64.4% of the total in 2015Q3 according to our calculations. These figures are indicative of the leading role of housing in the wealth portfolios of Greek households and are consistent with Eurostat data on the distribution of the population by tenure status. According to these data, Greece remains a country with relatively high home ownership, with the ratio of home owners in 2014 amounting to 74.0%, versus 66.9% in the Euro Area.

4. Empirical Methodology and Data

Empirical methodology

Following the theoretical considerations set out in Section 2, and with the aim to enrich existing empirical evidence with an application to the case of Greece, in this paper we apply the standard cointegration and error correction model (ECM) approach to examine potential wealth effects on consumption. This two-step methodology is widely used in the relevant empirical literature in order to investigate the relationship between consumption and wealth. In a first step, it enables a straightforward investigation of the long-run link between the core variables examined. In a second step, it allows for the inclusion of short-run dynamics in the equations under estimation, in which stationarity is ensured by using variables in first differences.

More specifically, according to the basic long-run relationship, trends in consumption are linked to trends in income and wealth. Since we want to disentangle between potential effects related to financial and housing wealth, total wealth is further split into the financial and housing wealth components. We do that in order to enable separate identification of the reaction of consumption to both types of shocks. In the short run, deviations from the long-run equilibrium might be observed, assuming that this disequilibrium will be gradually corrected towards the long-run relationship. These basic features are captured by the cointegration and the ECM methodologies.

Given, further, that we want to directly obtain MPCs out of the long-run regression, we choose to estimate the equation in levels rather than in logarithmic form. In the alternative case of using logarithmic specifications, the coefficients obtained reflect elasticities which can be used, together with the sample averages of the wealth-to-consumption ratios, to obtain MPCs. Still, and as indicated by Chauvin and Damette (2010), the two measures are equivalent only in the case of a stable ratio of wealth to consumption over time. This, however, does not always seem to be the case. Given that one can expect wide variations in this ratio over time, and based on further theoretical considerations indicating the superiority of direct MPC estimation, as pointed out by Altissimo *et al.* (2005), the level representation is considered to be more satisfactory, especially when the aim is to disaggregate wealth into components.

In a first step, we estimate the cointegrating relation using total net wealth. Next, we estimate the relation using the disaggregated components of net financial and net housing wealth, but also conduct the analysis using only the net housing wealth component, as a robustness check. The long-run relationship between consumption, income and wealth is estimated using the Fully Modified Ordinary Least Squares technique (FMOLS) (Phillips and Hansen, 1990). This technique is based on a modification of least squares in order to account for both serial correlation effects and for endogeneity among regressors, resulting from the existence of a cointegrating relationship. In order to test the cointegration hypothesis, we apply the Engle-Granger (1987) and Phillips-Ouliaris (1990) tests.

The three distinct long-run equations are then formulated as follows:

$$C_{1t} = \alpha_0 + \alpha_Y Y_t + \alpha_T TW_t + \varepsilon_{1t} \tag{3}$$

$$C_{2t} = \beta_0 + \beta_Y Y_t + \beta_F FW_t + \beta_H HW + \varepsilon_{2t} \tag{4}$$

$$C_{3t} = \gamma_0 + \gamma_Y Y_t + \gamma_H HW + \varepsilon_{3t} \tag{5}$$

where equation (3) relates consumption to total wealth, equation (4) differentiates between the two distinct wealth components –financial and housing wealth– and equation (5) includes only housing as a wealth component. In the equations presented above, C_t denotes consumption expenditure at time t, Y_t stands for income, TW, FW, HW, indicate total, financial and housing wealth, respectively, α, β, γ refer to the corresponding coefficients and ε_t stands for the error term in each equation.

In the second step, we apply the ECM specification to estimate the short-run equation by OLS. We run the model in first differences, in order to investigate the adjustment process to the long-run equilibrium, which is estimated in the first stage, and the short-run dynamics. We use the long-run residuals obtained from the first stage equation and include them as an error correction term (ECT) lagged by one period. The short-run equation is formulated as follows:

$$\Delta C_t = \delta_0 + \sum_i^p \delta_i \Delta C_{t-i} + \sum_i^p \theta_i \Delta Y_{t-i} + \sum_{i=0}^p \varphi_{Fi} \Delta FW_{t-i} + \sum_{i=0}^p \varphi_{Hi} \Delta HW_{t-i} + \vartheta ECT_{t-1} + u_t \tag{6}$$

where Δ denotes the first difference operator and ECT_{t-1} is the error correction term, lagged by one period. The coefficient on this term, ϑ, measures the speed of adjustment to the long-run relation, from a deviation in the short run caused by shocks to the system. It is expected to have a negative sign, so when consumption moves away from its equilibrium value, it then adjusts back to that value in the next period. When using quarterly data, ϑ reflects the adjustment within a period of one quarter; it, therefore, follows that the higher the coefficient in absolute terms, the quicker the corresponding adjustment will be. Note that we choose the lag lengths of the variables included on the basis of the Akaike information and/or the Schwarz criteria.

Data employed

The dataset used in the present paper is based on quarterly data for Greece over the period 2000Q1 to 2015Q3.

For consumption, we employ quarterly, seasonally adjusted data from ELSTAT for the category of households and NPISH, in nominal terms. For income, we use quarterly data for the compensation of employees and, alternatively, net disposable income, available from ELSTAT in nominal terms on a non-seasonally adjusted

basis. To derive seasonally adjusted income series, we perform seasonal adjustment using the X12 procedure.

For financial wealth we employ data from ELSTAT for the financial assets of households and NPISH in nominal terms. In the case of Greece, these assets consist primarily of deposits, shares and other equity, but also include other items, such as currency, other securities and equity in life insurance and pension fund reserves. To obtain net financial wealth, we subtract the financial liabilities of households (excluding mortgage debt, from the Bank of Greece) from nominal financial wealth.

Finally, for housing wealth we use the new net housing wealth series constructed for the purpose of the present paper and described in detail in Section 3.

5. Results of the Analysis

In the first step of our empirical analysis we test for the stationarity of consumption, compensation of employees[3], net financial wealth, net housing wealth and net total wealth using the Augmented Dickey-Fuller (ADF, Dickey and Fuller, 1979, Said and Dickey, 1984), the Phillips-Perron (PP, 1988) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS, 1992) unit root and stationarity tests. Results are reported in Table 1. Based on testing results at the 5% significance level (and, in one case, at the 10% level), tests in levels indicate that the variables are non-stationary, while tests in first differences suggest stationarity. As a result, the evidence obtained is in favour of the argument that the underlying variables are integrated of the same order, i.e. of order one. On the basis of this finding we can proceed with the implementation of the two-step Engle-Granger cointegration and ECM analysis[4].

---

3. Compensation of employees excludes property income, contrary to disposable income. Thus, for the basic estimations we choose to use compensation of employees as the variable representing income to avoid using a measure for income which could be directly related to the stock of wealth. See also the discussion and references in Kerdrain (2011). However, for the purposes of checking for the robustness of our results, we also employ disposable income. Note, that the corresponding stationarity test results for the disposable income series are similar as in the case of compensation of employees.
4. Note that in the case of uncertainty on whether the variables investigated exhibit different orders of integration, i.e. being I (0) and I (1), the Autoregressive Distributed Lag (ARDL) procedure is more suitable. As Pesaran *et al.* (2001) indicate, this approach is developed for the examination of the existence of a level relationship between a dependent variable and a set of regressors, when there is uncertainty as to the variables being trend- or first-difference stationary.

Table 1. Unit root and stationarity testing results

Testing procedure (series in levels, 1st differences)	Consumption	Compensation of employees	Net financial wealth	Net housing wealth	Net total wealth
ADF					
Levels	-0.07	-0.70	-2.35	0.12	0.02
	(0.99)	(0.97)	(0.40)	(0.99)	(0.99)
1st differences	-6.80*	-9.01*	-8.59*	-4.19*	-7.02*
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)
PP					
Levels	-0.31	-0.62	-2.46	0.49	-0.18
	(0.99)	(0.97)	(0.34)	(0.99)	(0.99)
1st differences	-6.88*	-9.01*	-8.42*	-4.15*	-7.15*
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)
KPSS					
Levels	0.24	0.25	0.13	0.24	0.23
1st differences	0.13	0.11	0.07	0.15	0.14

Note: p-values in parentheses. For the ADF and PP tests, * indicates that the null hypothesis of a unit root is rejected at 5% significance level. For the KPSS test, with the underlying hypothesis of stationarity, the asymptotic critical values are 0.12, 0.15 and 0.22 at the 10%, 5% and 1% critical levels, respectively. We report testing results including a constant and trend.

Following the stationarity tests, we proceed with the investigation of the long-run relationship between consumption, compensation of employees and wealth, using the FMOLS technique. Results are reported in Table 2. First, we estimate the relationship between consumption, compensation of employees and net total wealth with the results obtained suggesting that both income and total wealth have positive and statistically significant coefficients at the 1% level. As a next step, we proceed to estimate the long-run relationship, this time disaggregating net total wealth into its components, net financial wealth and net housing wealth. The results indicate that compensation of employees and net housing wealth have positive and statistically significant coefficients at the 1% level, while net financial wealth has a positive and significant coefficient at the 5% level. Removing the latter variable, we estimate a long-run relationship between consumption, compensation of employees and net housing wealth. The results confirm the positive and statistically significant coefficients of both compensation of employees and net housing wealth.

Table 2. Private consumption and wealth: estimates of the long-run relationship

| Variable	Coefficient (p-value)
Total wealth	
Compensation of employees	1.21* (0.00)
Net total wealth	0.01* (0.00)
Disaggregated wealth	
Compensation of employees	1.14* (0.00)
Net financial wealth	0.01** (0.04)
Net housing wealth	0.01* (0.01)
Housing wealth	
Compensation of employees	1.13* (0.00)
Net housing wealth	0.01* (0.01)
R^2=0.98 for all three equations. The Wald coefficient tests reject joint hypotheses of zero coefficients. In the second equation, the Wald test rejects the hypothesis also when excluding compensation of employees.	

Note: Equations include a constant and trend.
* and ** indicate significance at the 1% and 5% level, respectively.

Using the equation with disaggregated wealth as a benchmark case, actual consumption can be plotted against the resulting long-run equilibrium path of consumption, together with the corresponding cointegration residual. Note that positive residuals represent periods of above equilibrium, while negative residuals stand for periods of below equilibrium consumption levels. As becomes obvious from Figure 5, it was mainly the time period 2006-2012 (apart from the extreme value in 2001Q3) which was characterized by more remarkable fluctuations of the residuals around zero, indicating alternating periods of below and above equilibrium levels of consumption.

It is interesting to observe that during the first two years of economic crisis in the country, namely 2008 and 2009, consumption partly overshot relative to its equilibrium level, while it remained below equilibrium during the following three years of severe recession, namely from 2010 to 2012. The latter developments are most probably related to the corresponding significant decline in income. The subsequent smoother path of this crucial variable also seems to explain the relatively narrow fluctuations of the residual above zero in the more recent time period, including the years 2013-2015.

Figure 5. Actual, cointegration-implied equilibrium level of consumption and residual (million €)
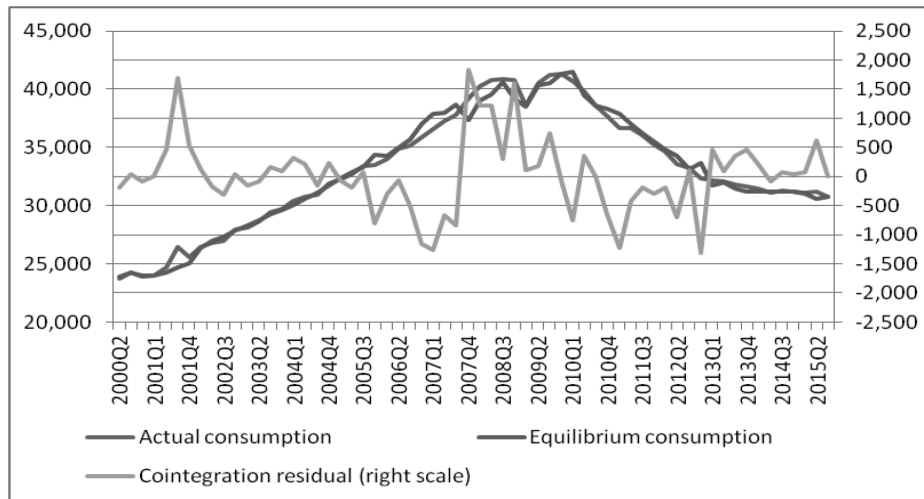
Sources: ELSTAT and authors' estimations.

The Engle Granger and Phillips-Ouliaris tests for cointegration are applied to the three specifications estimated above and the resulting statistics are reported in Table 3. In the specification employing total wealth, the null of no cointegration is rejected at the 1% significance level in all cases. In the specification with disaggregated wealth, cointegration is implied by rejection of the null at the 5% significance level in the cases of both tests. Finally, in the specification employing housing wealth only, the null of no cointegration is rejected at the 5% significance level in the case of the Engle Granger, and at the 1% level in the case of the Phillips-Ouliaris test.

Table 3. Tests for cointegration

	Total wealth	Disaggregated wealth	Housing wealth
Engle-Granger tau-statistic	-5.23*	-4.98**	-4.87**
Engle-Granger z-statistic	-38.09*	-35.49**	-34.12**
Phillips-Ouliaris tau-statistic	-5.37*	-5.11**	-4.95*
Phillips-Ouliaris z-statistic	-40.72*	-37.74**	-35.10*

Note: With constant and trend. * and ** indicate significance at 1% and 5% level, respectively.

Overall, the above empirical evidence is satisfactory, since it is in favour of a positive and statistically significant cointegrating relationship between consumption and wealth, with positive financial and housing wealth effects in the long run. The MPC out of net total wealth is estimated at 0.01, while the resulting MPCs for net financial and housing wealth, when using disaggregated wealth effects, also amount to 0.01, being consistent with other findings in empirical studies of the effects of total or disaggregated wealth on consumption.

One point of concern regarding the results of cointegration analysis presented above could be the underlying assumption of a linear adjustment mechanism.[5] In other words, if the variables under investigation display an asymmetric adjustment process, depending on the state of the business cycle, misspecification issues could emerge. To make sure that the issue of a potential non-linear adjustment has been adequately considered, we use the resulting residuals from the long-run equations to estimate Threshold Autoregressive (TAR) and Momentum-TAR (M-TAR) models (Enders and Siklos, 2001). Testing results are summarised in Table 4. They indicate that in all cases and for all three alternative models (using total, disaggregated or only housing wealth) the two hypotheses of linear co-integration and symmetry cannot be rejected. As a result, we can conclude that there is no evidence of an asymmetric adjustment process characterising the response of consumption to wealth shocks.

Table 4. Cointegration tests with TAR and M-TAR adjustment

Threshold model *Statistic* [critical value]	Total wealth	Disaggregated wealth	Housing wealth
TAR			
F-equal	0.56* [5.80]	3.87* [5.31]	1.17* [5.87]
F-joint (Φ)	4.15* [8.54]	5.43* [10.49]	3.99* [8.49]
M-TAR			
F-equal	4.75* [8.01]	1.05* [7.98]	0.64* [7.90]
F-joint (Φ)	6.54* [9.74]	3.86* [11.63]	3.70* [9.70]

Notes: The threshold and the number of lags are determined by the data. We rely on simulated critical values at the 5% significance level. * indicates that the underlying hypothesis of equal adjustment coefficients (F-equal statistic) and no cointegration in the residuals (F-joint statistic, Φ) cannot be rejected.

---

5. As Marquez *et al.* (2013) indicate, the reasons for which consumption might respond asymmetrically to wealth shocks are discussed in the relevant literature from both a micro- and a macroeconomic point of view. In the latter case, liquidity constraints could be seen to present an important factor for explaining asymmetries. The authors offer a summary of related empirical findings, mostly for the US.

In order to further enrich our empirical application and for the purpose of conducting a robustness and sensitivity analysis, we also perform several additional estimations and tests. As a test of parameter stability, and relying on the equation with disaggregated wealth, we conduct the Hansen cointegration test and, based on the probability obtained, we cannot reject the null hypothesis of cointegrated series at conventional levels. As a check for the stability of the cointegrating relationship over time, we examine how the MPCs out of financial and housing wealth have evolved by applying recursive regression analysis. We start with a benchmark sample including observations for the period 2000Q1 to 2007Q4 and move on by extending the window of 32 observations by one in each step. We further use the residuals obtained from each step to conduct unit root tests. Based both on the estimated coefficients for net financial and housing wealth and the unit root testing results, we can conclude that the cointegrating relation does not exhibit signs of significant variation over time.

Further, to strengthen the evidence for the significant effect of wealth on consumption, we also use disposable income instead of compensation of employees and split the housing wealth variable into housing stock and housing prices.[6] In the first case, the resulting evidence from the equations using either total wealth or disaggregated wealth supports the significance of wealth in shaping consumption, as well as the hypothesis that the variables investigated are cointegrated. It is interesting to note that when using disaggregated wealth, financial wealth does not seem to be significant, while housing wealth has a positive and significant coefficient. When separating the housing stock from the housing price effect, and including net financial wealth alongside with compensation of employees in the long-run equation, it is remarkable that only the housing stock seems to play a role in shaping consumption in the long run, while housing prices appear to be non-significant.

Moving on with the short-run analysis, the dynamic specification using disaggregated wealth also yields satisfactory results with respect to the role of wealth in shaping consumption (see Table 5). More specifically, the lagged ECT –the lagged residual from the long-run regression of consumption on compensation of employees, net financial wealth and net housing wealth– has a significant coefficient with the expected negative sign. On the basis of this coefficient, the speed of adjustment towards equilibrium is 0.28% per quarter. Concerning the short-run effects of wealth components on consumption, the coefficients on both the change in net financial and housing wealth are positive and significant at the 5% level. For the change in net housing wealth the coefficient is estimated at 0.03, while for the change in net financial wealth the corresponding coefficient is estimated at 0.01. The lagged effects of changes in wealth components are also found to be significant at the 5% level.

---

6. See Navarro and de Frutos (2015). For housing stock we employ housing surface in thousand m^2, while for housing prices we use the house price index for urban areas.

Table 5. Private consumption and disaggregated wealth: estimates of the short-run relationship

Variable	Coefficient	(p-value)
Δ Consumption (-1)	1.02*	(0.00)
Δ Compensation of employees	0.34**	(0.02)
Δ Compensation of employees (-1)	-0.39**	(0.02)
Δ Net financial wealth	0.01**	(0.02)
Δ Net financial wealth (-1)	-0.01**	(0.03)
Δ Net housing wealth	0.03**	(0.02)
Δ Net housing wealth (-1)	-0.03**	(0.02)
ECT (-1)	-0.28**	(0.03)

Note: * and ** indicate significance at 1% and 5% level, respectively.

Overall, the results indicate that in the short run both wealth components play a role in shaping consumption, with the effect, however, of housing wealth being at least twice as large as the effect of financial wealth. Interestingly, similar results are obtained when using disposable income instead of compensation of employees. More specifically, we also obtain a negative and significant coefficient on the lagged error correction term and positive and significant coefficients on the change in net financial and housing wealth, with slight differences concerning the significance of their lagged terms. The most important difference refers to the non-significance of the change in disposable income, which also holds for the first two lags of the variable. Finally, when separating between the change in housing stock and housing prices in the short-run equation (including the change in net financial wealth alongside the change in compensation of employees), there are indications that the housing price effect becomes significant in some cases and depending on the lagged terms included, while the housing stock effect turns out to be insignificant. Note, still, that in most of these cases, the incorporated error correction term also remains insignificant.

6. Discussion

The results of our analysis point to the existence of a statistically significant cointegrating relationship between consumption and wealth, with positive financial and housing wealth effects in the long run. In the short run financial and housing wealth also appear to play a role in determining consumption, with the importance of housing wealth being higher compared to that of financial wealth.

Notably, despite their relatively small size, the coefficients of the wealth variables in the relationships estimated above are translated into substantial wealth effects in the case of Greece. This holds particularly in the case of housing, where changes in household wealth in the course of the period examined were very large and wealth effects were present, according to our results, both in the short and in the long run.

Considering the developments during the period of crisis, our results suggest that the sharp decline in housing wealth has played a significant role in the rapid downward trend, followed by private consumption until recently. Furthermore, with private building activity still contracting, and house prices continuing their decline, the resulting persistent loss of housing wealth may be acting against a recovery in private consumption.

With respect to the impact of household financial wealth in the course of the crisis, our results indicate that negative developments in the value of household equity, via intense shocks in the ASE General Index, have contributed towards the decline in private consumption over this period. In parallel, a negative contribution to developments in private consumption has emerged due to the concurrent decline in household deposits. However, caution is recommended in assessing the exact impact of this decline, as in the case of Greece, movements in deposits in the course of the crisis do not always reflect a depletion of past savings (and, hence, of wealth) to meet needs in a period of falling incomes and rising tax burdens. Instead, at times, these movements are partly associated with the flight of deposits from Greece, in response to developments in economic uncertainty.

In view of the above considerations, policies that would contribute towards the stabilisation of housing investment and house prices could reinforce the path towards viable GDP growth through elimination of negative housing wealth effects on consumption. In this framework, the re-assessment of the system of taxation of real estate property in the direction of lifting excessive tax burdens features as a key policy recommendation, acting in favour of easing downward pressures on house prices.

In addition to the above, and with the objective of a speedy recovery in mind, fiscal and structural policies that will safeguard the stability of the economy and contribute to the recovery of investment, may enhance sustainable GDP growth also via positive financial market effects that can have a favourable impact on private consumption. However, attention is recommended with respect to policy choices involving the imposition of additional tax burdens on households. Since such policies are binding within the framework of the current economic adjustment programme, they could to a certain degree impede private consumption growth, not only via their negative effects upon disposable income, but also through a further depletion of household deposits and a corresponding negative wealth effect.

References

Altissimo, F., Georgiou, E., Sastre, T., Valderrama, M. Ts., Sterne, G., Stocker, M., Weth, M., Whelan, K. and Willman, A., 2005, "Wealth and Asset Price Effects on Economic Activity", *ECB Occasional Paper*, No. 29.

Ando, A. and Modigliani, F., 1963, "The 'Life Cycle' Hypothesis of Saving: Aggregate Implications and Tests", *The American Economic* Review, 53(1), 55-84.

Aron, J., Muellbauer, J. and Murphy, A., 2006, "Housing Wealth, Credit Conditions and Consumption", *MPRA Paper*, No. 24485.

Bampinas, G., Konstantinou, P. and Panagiotidis, T., 2017, "Inequality, Demographics and the Housing Wealth Effect: Panel Quantile Regression Evidence for the US", *Finance Research Letters*, forthcoming.

Barrell, R., Choy, A. and Riley, R., 2003, "Consumption and Housing Wealth in the UK", *National Institute Economic Review*, No. 186, 53-56.

Barrell, R., Costantini, M. and Meco, I., 2015, "Housing wealth, financial wealth, and consumption: New evidence for Italy and the UK", *International Review of Financial Analysis*, 42, 316-323.

Bassanetti, A. and Zollino, F., 2010, The Effects of Housing and Financial Wealth on Personal Consumption: Aggregate Evidence for Italian Households, in O. de Bandt, T. Knetsch, J. Peñalosa (eds.), *Housing Markets in Europe - A Macroeconomic Perspective*, Berlin: Springer, 307-332.

Bayoumi, T. and Edison, H., 2003, "Is Wealth Increasingly Driving Consumption?", *De Nederlandsche Bank Staff Reports*, No. 101.

Benjamin, J. D., Chinloy, P. and Jud, G. D., 2004, "Real Estate Versus Financial Wealth in Consumption", *Journal of Real Estate Finance and Economics*, 29(3), 341-354.

Bertaut, C. C., 2002, "Equity Prices, Household Wealth, and Consumption Growth in Foreign Industrial Countries: Wealth Effects in the 1990s", *Board of Governors of the Federal Reserve System International Finance Discussion Paper*, No. 724.

Bokhari, S. and Geltner, D., 2014, "Characteristics of Depreciation in Commercial and Multi-Family Property: An Investment Perspective," *Working Paper*, *MIT Center for Real Estate.*

Boone, L. and Girouard, N., 2002, "The Stock Market, the Housing Market and Consumer Behaviour", *OECD Economic Studies*, No. 35, 175-200.

Botazzi, R., Trucchi, S. and Wakefield, M., 2013, "Wealth effects and the Consumption of Italian Households in the Great Recession", *IFS Working Paper* W13/21.

Byrne, J. P. and Davis, E. P., 2003, "Disaggregate Wealth and Aggregate Consumption: an Investigation of Empirical Relationships for the G7", *Oxford Bulletin of Economics and Statistics*, 65(2), 197-220.

Campbell, J. Y. and Mankiw, N. G., 1989, Consumption, Income and Interest Rates: Reinterpreting the Time Series Evidence, in O. J. Blanchard and S., Fisher (eds.), *NBER Macroeconomics Annual 1989*, Volume 4, 185-246.

Carroll, C. D., Otsuka, M. and Slacalek, J., 2011, "How Large Are Housing and Financial Wealth Effects? A New Approach", *Journal of Money, Credit and Banking*, 43(1), 55-79.

Case, K. E., Quigley, J. M. and Shiller, R. J., 2011, "Wealth Effects Revisited 1978-2009", *Cowles Foundation Discussion Paper*, No. 1784.

Case, Karl E., Quigley, J. M. and Shiller, R. J., 2005, "Comparing Wealth Effects: The Stock Market Versus the Housing Market," *Advances in Macroeconomics*, 5(1), 1-32.

Catte, P., Girouard, N., Price, R. W. and André, C., 2004, "Housing Markets, Wealth and the Business Cycle", *OECD Economics Department Working Papers*, No. 394.

Chauvin, V. and Damette, O., 2010, "Wealth Effects on private Consumption: the French Case", in O. de Bandt, T. Knetsch, J. Peñalosa (eds.), *Housing Markets in Europe - A Macroeconomic Perspective*, Berlin: Springer, 263-282.

Christelis, D., Georgarakos, D. and Jappelli, T., 2014, "Wealth shocks, unemployment shocks and consumption in the wake of the Great Recession", *CFS Working Paper Series*, No. 471.

Ciarlone, A., 2011, "Housing wealth effect in emerging economies", *Emerging Market Review*, 12, 399-417.

De Bonis, R. and Silvestrini, A., 2012, "The Effects of Financial and real Wealth on Consumption: New Evidence from OECD Countries", *Applied Financial Economics*, 22, 409-425.

Dickey, D. A. and Fuller, W. A., 1979, "Distribution of the Estimators for Autoregressive Time Series with a Unit Root", *Journal of the American Statistical Association*, 74(366), 427-431.

Dreger, C. and Reimers, H. E., 2006, "Consumption and Disposable Income in the EU countries: the Role of Wealth Effects", *Empirica*, 33, 245-254.

Dreger, C. and Reimers, H. E., 2012, "The long run relationship between consumption and wealth: Common and idiosyncratic effects", *Portuguese Economic Journal,* 1, 21-34.

Dvornak, N. and Kohler, M., 2007, "Housing Wealth, Stock Market Wealth and Consumption: A Panel Analysis for Australia", *The Economic Record*, 83(261), 117-130.

Edelstein, R. H. and Lum, S. K., 2004, "House prices, wealth effects, and the Singapore macroeconomy", *Journal of Housing Economics*, 13, 342-367.

Enders, W. and Siklos, P. L., 2001, "Cointegration and Threshold Adjustment", *Journal of Business and Economic Statistics,* 19(2), 166-176.

Engle, R. F. and Granger, C. W. J., 1987, "Co-Integration and Error Correction: Representation, Estimation and testing", *Econometrica*, 55(2), 251-276.

Fisher, L. A., Otto, G. and Voss, G. M., 2010, "The response of Australian consumption to housing wealth", *Journal of Macroeconomics*, 32, 284-299.

Friedman, M., 1957, *A Theory of the Consumption Function*, Princeton: Princeton University Press.

Galli, A., 2016, "How reliable are cointegration-based estimates for wealth effects on consumption? Evidence from Switzerland", *SNB Working Paper*, No. 3.

Girouard, N. and Blöndal, S., 2001, "House prices and Economic Activity", *OECD Economics Department Working Papers*, No. 279.

Guo, S. and Hardin, W. G., 2014, "Wealth, Composition, Housing, Income and Consumption", *The Journal of Real Estate Finance and Economics*, 48, 221-243.

Hamburg, B., Hoffmann, M. and Keller, J., 2008, "Consumption, wealth and Business Cycles in Germany", *Empirical Economics*, 34, 451-476.

Holmes, M. J. and Shen, X., 2015, "On wealth volatility, asymmetries and the average propensity to consume in the United States", *Applied Econometrics and International Development*, 15(1), 69-78.

Iacoviello, M., 2004, "Consumption, house prices, and collateral constraints: a structural econometric analysis", *Journal of Housing Economics*, 13, 304-320.

Jansen, E. S., 2010, "Wealth Effects on Consumption in Financial Crises: The Case of Norway", *Statistics Norway research department Discussion Papers*, No. 616.

Jaramillo, L. and Chailloux, A., 2015, "It's Not All Fiscal: Effects of Income, Fiscal Policy, and Wealth on Private Consumption", *IMF Working Paper*, No. 15/112.

Kerdrain, C., 2011, "How important is wealth for Explaining Household Consumption Over the Recent Crisis?: An Empirical Study for the United States, Japan and the Euro Area", *OECD Economics Department Working Papers*, No. 869.

Kostenbauer, K., 2001, "Housing Depreciation in the Canadian CPI," Prices Division, Statistics Canada, *Catalogue*, No. 62F0014MIE, Series No. 15.

Kwiatkowski, D., Phillips, P. C. B., Schmidt, P. and Shin, Y., 1992, "Testing the null hypothesis of stationarity against the alternative of a unit root", *Journal of Econometrics*, 54, 159-178.

Labhard, V., Sterne, G. and Young, C., 2005, "Wealth and Consumption: An Assessment of the International Evidence", *Bank of England Discussion Paper*, No. 275.

Lettau, M. and Ludvigson, S., 2001, "Consumption, Aggregate Wealth, and Expected Stock Returns", *The Journal of Finance*, 56(3), 815-849.

Lettau, M. and Ludvigson, S., 2004, "Understanding Trend and Cycle in Asset Values: Reevaluating the Wealth Effect on Consumption", *The American Economic Review,* 94(1), 276-299.

Márquez, E., Martínez-Cañete, A. R. and Pérez-Soba, I. , 2013, "Wealth shocks, credit conditions and asymmetric consumption response: Empirical evidence for the UK", *Economic Modelling*, 33, 357-366.

Mitrakos, T. , 2009, Statistical data and real estate prices: The new initiative of the Bank of Greece, in *Real estate market: developments and prospects*", Athens: Bank of Greece, 129-77 (in Greek).

Modigliani, F. and Brumberg, R., "Utility Analysis and Aggregate Consumption Functions: An Attempt at Integration", unpublished.

Muellbauer, J. N., 2007, "Housing, Credit and Consumer Expenditure", *Proceedings-Economic Policy Symposium-Jackson Hole*, Federal Reserve Bank of Kansas City, 267-334.

Musso, A., Neri, S. and Stracca, L., 2011, "Housing, consumption and monetary policy: How different are the US and the euro area?", *Journal of Banking & Finance*, 3019-3041.

Navarro, M. L. and de Frutos, R. F., 2015, "Residential versus financial wealth effects on consumption from a shock in interest rates", *Economic Modelling*, 49, 81-90.

O' Donnell, N., 2007, "Housing wealth and Consumption", *Central Bank and Financial Services Authority of Ireland Quarterly Bulletin*, 1, 119-136.

Peltonen, T. A., Sousa, R. M. and Vansteenkiste, I. S., 2012, "Wealth effects in emerging market economies", *International Review of Economics and Finance*, 24, 155-166.

Pesaran, M. H., Shin, Y. and Smith, R. J., 2001, "Bounds testing approaches to the analysis of level relationships". *Journal of Applied Econometrics*, 16, 289-326.

Phillips, P. C. B. and Hansen, B. E., 1990, "Statistical Inference in Instrumental Variables Regressions with I(1) Processes", *Review of Economic Studies*, 57, 99-125.

Phillips, P. C. B. and Ouliaris, S., 1990, "Asymptotic Properties of Residual Based Tests for Cointegration", *Econometrica*, 58, 165-193.

Phillips, P. C. B. and Perron, P., 1988, "Testing for Unit Roots in Time Series Regression", *Biometrika,* 75, 335-346.

Pichette, L and Tremblay, D., 2003, "Are Wealth Effects Important for Canada?", *Bank of Canada Working Papers*, No. 30.

Poterba, J. M., 2000, "Stock Market Wealth and Consumption", *The Journal of Economic Perspectives*, 14(2), 99-118.

Saad, W., 2011, "An Econometric Study of the Private Consumption Function in Lebanon", *International Research Journal of Finance and Economics*, 61, 29-41.

Said, S. E. and Dickey, D. A., 1984, "Testing for Unit Roots in Autoregressive-Moving Average Models of Unknown order", *Biometrika*, 71(3), 599-607.

Sastre, T. and Fernández, J. L., 2010, "An Assessment of Housing and Finacial Wealth Effects in Spain: Aggregate Evidence on Durable and Non-durable Consumption", 283-306, in *Housing Markets in Europe - A Macroeconomic Perspective*, O. de Bandt, T. Knetsch, J. Peñalosa (eds.), Berlin: Springer.

Schmid, F., 2013, "Wealth Effects on Consumption in Switzerland", *Swiss Society of Economics and Statistics,* 149, 87-110.

Shen, X., Holmes, M. J. and Lim, S., 2015, "Wealth Effects and Consumption: A Panel VAR Approach", *International Review of Applied Economics*, 29, 221-237.

Skudelny, F., 2009, "Euro Area Private Consumption: Is there a role for Housing Wealth Effects?", *ECB Working Paper Series*, No. 1057.

Slacalek, J., 2009, "What Drives Personal Consumption? The Role of Housing and Financial Wealth, *The B.E. Journal of Macroeconomics* (Topics), 9(1), Article 37.

Šonje, A. A., Časni, A. C. and Vizek, M., 2012, "Does housing wealth affect private consumption in European post-transition countries? Evidence from linear and threshold models", *Post-Communist Economies*, 24, 73-85.

Šonje, A. A., Časni, A. C. and M. Vizek, 2014, "The effect of housing and stock market wealth on consumption in emerging and developed countries", *Economic Systems*, 38, 433-450.

Tang, K. K., 2006, "The Wealth Effect of Housing on Aggregate Consumption", *Applied Economics Letters*, 13, 189-193.

Exploring the EU's Legitimacy Crisis: The Dark Heart of Europe

by Christian Schweiger
published by Edward Elgar, Cheltenham, UK, Northampton, MA, USA, 2016, pp. 283
ISBN: 978–1-78471-784-1 (cased)
ISBN: 978–1–78471-785-8 (eBook)

reviewed by Kyriakos Kentrotis[*]

Christian Schweiger's study was completed and published at a time of mixed feelings about the European Union. On the one hand, the 60th anniversary of the signing of the Treaty founding the European Economic Community will be celebrated by a special meeting hosted in Rome by the European Council on March 25, 2017. On the other hand, EU's institutions and member-states are still troubled by the refugee/immigration problem; the rise of the extreme right and anti-European parties and the nationalistic and racist rhetoric calling for closing its borders; the consequences of Brexit implementation; the resurfacing of plans for a multi-speed, variable-geometry Europe, and the still unresolved issue of the economic crisis in Greece.

The sub-title "The Dark Heart of Europe" neatly distils the conjuncture of the historic progress of this "Strange Superpower"[1], the EU, with the dual intermediating state of its structures and policies still unfinished: on the one hand there are the sovereign nation-states, which are hostile to the institutions of European integration, although their long-term interests are aligned with it; on the other, there are the citizens of this supranational EU, who also constitute the foundation of the democratic legitimacy of those same nation-states. The contradictory nature of the role that the citizens of Europe are called to play in the legitimisation of the on-going European integration project lies at the heart of the study and is presented in eight chapters.

The book analyses the issues of the EU's history to date, in conjunction with aspects of its economic and political governance, both within its institutions and in the context of the common foreign and common defence and security policies sought-after. In style,

[*] Professor, School of Economic and Regional Studies, Department of Balkan, Slavic and Oriental Studies, University of Macedonia, Thessaloniki, Greece.

1. David Buchan (1993). *Europe: the Strange Superpower*. Aldershot: Dartmouth Publishing.

structure and chapter content, the book is a serious academic monograph as well as a work suitable for members of the general public seeking to enrich their knowledge about the EU. The study gains additional interest from the author's use of supporting material, including statistics and survey data, and judiciously selected passages from reports by politicians, eminent personalities and institutions concerning the progress of EU integration. The fact, too, that he has been able to make excellent use of relevant German-language literature, as well as that in English, is an additional advantage, and one that expands the scope of his arguments.

The study's main conclusion is that the progress of the EU has been marked by the emergence of a virtuous cycle of mutual benefits. Up to 1990, over the years of permissive consensus, nation-states and their political and financial elites cashed in on the added value of supranational experiments, while the peoples of Europe enjoyed the promise of the plus-value added through those experiments concerning goods of consumer democracy. After 1990, intensive transgovernmentalism gradually came to prevail, as the vision of European integration metamorphosed into a standardised, utilitarian method of governance, in which supranational promises were expendable and intergovernmental conflicts heightened.

The book's first three chapters discuss the history of European integration, and its basic theses may be summarised as follows: over the years, there developed an image of integration based on policies without politics through a never-ending zero-sum game of bargaining behind closed doors. The vision of European integration sought-after may have been the spill-over of a more general European mentality transcending national interests, but this was transmuted into the gift of the founding and development of an 'internal market', underpinned by the free movement of goods, people, services and capital. In reality, European integration became synonymous with market liberalisation via an elite technocratic web, at the expense of the political integration promised.

Conceived in the mould of the nation-state, the EU has been thus far shaped by the twin forces of those who "would, but cannot" (member-states/EU's ruling elites) and those who "could, but will not" (EU's ruling elites/member-states). As a superstructure, the EU has a tremendous democratic and political deficit and prioritises the technocratic *acquis communautaire* (the emphasis being on law and the economy). In contrast, democratic and political *acquis* are enjoyed by its member-states, since their primary constituent unit is the people as the sum of citizens with rights and obligations, while, at the same time, they seek to harmonise their national structures, as far as possible, with the *acquis communautaire*.

The author supports his observations with solid evidence, primarily through the catalytic example of the confrontational co-existence of the Union's three largest states, namely, France, Germany and the United Kingdom, both in the critical 30 years before Maastricht and since then until Lisbon and tackling the economic crisis. In every instance, each of those countries exhibits its own national superiority or assumes the personality of its leader, addressing the question of Europe in a similar manner. De Gaulle's mistrust of the UK, Thatcher's determined Euroscepticism, the endless Franco-German balancing

act between (in)formal transgovernmental bargaining and Germany's reluctant hegemony with Chancellor Merkel's personal stamp on micro-level and short term policy management, are just some of the crucial points along the path of European integration through the historical, political and economic weight of the Union's big three.

By contrast, the matter of European integration arouses far less interest and passion among its citizens. The EU may be a world player, and may dominate European and global political news, but within Europe itself its function and structure remain topics hard-to-understand, with little appeal for the general populace. The EU has become too overloaded with institutions whose function and democratic legitimacy are hard to discern to become a real part of the everyday life of its citizens, who, indeed, often feel confused about the activities of those institutions, and their own rights and obligations in relation to the corresponding national framework of institutions, rights and obligations.

The leaders of the EU rapidly recognised that it was not going to be easy to build a collective European consciousness based only on numbers, within the framework of a top-down policy inspiration. The study analyses with great clarity the EU's changes of tune since the experiment of the Constitutional Treaty. These reflect the frictions and conflicts at community level, residing mainly in the lack of political will, due to the absence of a political core that, as an assimilating mechanism, would propel the EU towards common decisions. The people were afraid of the new challenges and reacted emotionally, choosing the national refuge of security as regards their historically entrenched political and constitutional rights. The 'aristocratic' approach to everyday affairs of Europe's citizens and their entrenched democratic circumstances through the application of technocratic measures by Brussels bureaucrats was hard to swallow for the average European accustomed to social rights.

In the economic part of the study (Chapters 4 and 5), the author charts, with tables and survey data, the triumph of the technocrats and Europe's asymmetrical integration at the expense of a more general strategic plan regarding the EU's social face. More specifically, he notes the expectation, shared by most European citizens, of more collective action in health and social security matters at an age when, as he points out, the only dance on the programme is the neoliberal twist (p. 163) of flexicurity in the workplace and other areas. In an attempt to adapt to the relentless struggle of all actors in the globalisation of the markets for profits, the EU has become a 'blind aggressor' (p. 173) attacking all traditional rights and values of the European *acquis communautaire*.

Chapters 6 and 7, which constitute the political part of the study, present an analysis of, respectively, the cases of the European Parliament and the common security and defence policy. The failure of the Union's political and economic elite to institute functional structural reforms through the Constitutional Treaty seems to have been counterbalanced by the Lisbon Treaty, as an attempt to accumulate greater democratic accountability, transparency, and increased efficiency in the framework of bureaucratic functionality balanced between the central European institutions and those of the member-states. The

author exhaustively analyses this upgrading of the European Parliament, but, in practice, it remains the least representative institution in the EU's decision-making process, turning its democratic deficit into a crisis of legitimacy in the minds of Europe's citizens.

With regard to matters of foreign, defence and security policy, the study captures the current state of affairs, shaped by the replacement of the collective egocentrism of the victors of WWII, under cover of the common European perspective of a better future, by the isolated egocentricity of national navel-gazing, leading to a reprise of the vicious cycle of unbridled power. For the USA, as the fundamental pillar of the security of the western world, the EU's views and aspirations for more civilian and normative power are not enough: the US is demanding specific steps towards strategic rationalisation with the adoption of realistic initiatives and increased defence spending. Essentially, as the author points out, what the US is urgently asking for is comparable flexicurity in defence matters within the framework of NATO.

Chapter 8 presents the author's conclusions, and here he does not confine himself to the finding that the EU cannot continue with its "one size fits all" policy, essentially advancing the interests of states and elites, rather than those of citizens, based on the rationale of a technocratic Union whose decisions, taken in side rooms, merely sustain an semblance of democracy. The EU's legitimacy crisis, both within its members and institutions and against the Union's citizens, is of long standing and requires not only bold decisions, but also the time to implement these gradually. The author returns to former German Foreign Minister Joschka Fischer's proposal for involving the member-states' national parliaments in European affairs as an interim measure; specifically, he had called for the creation of a second Chamber for the European Parliament, formed of representatives from the several national parliaments, as a means to increase direct and indirect participation of Union citizens, so as to construct a common European consciousness.

This book is more than just another conventional contribution to the study of European integration, swelling the literature on the subject. Rather, it is both a timely review of the European condition and a well-thought-out study taking a fresh take on the general discussion of the narrative on the future of European integration.

EU-Russian Relations and the Ukraine Crisis

by Nicholas Ross Smith

reviewed by George Voskopoulos[*]

EU-Russia relations have been defined by a number of defining parameters that affect the conflict-cooperation framework of the two actors. Nicholas Ross focuses on this complex relation by scrutinising the effects and side-effects of the Ukraine Crisis, as well as the role of western security architecture in qualitatively defining the cooperation-conflict ratio.

The author's descriptive approach covers both overt and covert elements that have constituted points of friction in an analysis that implicitly refers to a forceful interdependence framework. The Ukraine crisis has emerged as a critical test that still divides the two sides and sets challenges on multiple, inter-connected levels. Ross-Smith's supports that the crisis gave vent to divergent, if not contending, theoretical approaches to regional security settings and the way interests of the sides involved can be accommodated.

The book by Nicolas Roth Smith looks into the issue from different perspectives with a view to providing insight to a complex security spectrum that, to a great extent, defines security in the bilateral, multilateral and European contexts. The three levels of analysis used, namely historical, empirical and theoretical, provide an inclusive and conclusive picture of the choices made by the EU and Russia in the Ukraine crisis under the impact of NATO's expansion to the East.

The book reflects insights into neo-classical theory, defining the spatial dimension of the issue within the context of a "shared neighbourhood". The author defines Ukraine as a testing territory, a testing ground for EU – Russia relations. After pointing out the increased, in the specific milieu, importance of constructivism, he uses the main EU-centric theories of explaining EU foreign policy choices, namely: the institution-oriented approach

* George Voskopoulos, Associate Professor of European Studies, University of Macedonia, Thessaloniki, Greece.

and intergovernmentalism, providing hindsight for state action and autonomy. Ross-Smith puts emphasis on the issues emerging from these two approaches, since nominal EU common interest clashes with Member States' national interests. This *sui generis* approach is a third way mentioned in an effort to explain the formulation of foreign policy choices.

Russian foreign policy is analysed through the traditional method of analysis pattern, i.e., international system level analysis and state level analysis. Nicholas Ross Smith makes a distinction within the former, namely structuralistic and rationalistic analysis, in an effort to provide causal explanations to choices made. Within this spectrum, structural realist approaches emphasised the shift of Russia's preferences, a tendency which, according to the author, points to the need and actual quest for defining explanatory variables of state behaviour.

The security pillar of the two actors (EU-Russia) is scrutinised under different competitive perspectives, namely geopolitical, geoeconomic, energy and strategic, within a mutual completion mode. Trade, in particular, is analysed within a comparative framework, illustrating the ontological challenges for all sides involved in the security equation. Energy analysis is based on the status of Ukraine as a transit state and the way/circumstances the EU-Russia-Ukraine historical context has been shaped. Eventually, Smith points to an overt, yet subtle, clash of interests affecting the EU and Russia in the Ukraine conflict (based on "ideology and scope"), a fact that leads to existential dilemmas for Kiev, which is forced to make critical decisions determining the state's security and actual survival.

The EU and Russia are treated as adversaries, since they engage in international politics using soft and hard power. Russia is portrayed as a typical hard power actor, a fact that causes negative evaluation cognitions by a typical soft power like the EU. The use of literature is extensive in the author's quest for making comparative evaluative judgments. Ukraine is seen and treated as the major, but not sole, point of friction between the EU and Russia through a systemic prism, namely that of bipolarity and the emergence of a multipolar system. Positioned in Russia's vicinity, the Ukraine crisis is seen as an issue of exercising influence, especially after Russia's status shifted from a world pole to a second tier power. Relations between the EU and Russia are defined by the author in a pessimistic and a less pessimistic framework within a multilayered power range framework. The Ukraine crisis externalised Russia's military power, while illustrating "Ukraine's precarious geopolitical positioning between the EU and Russia".

In terms of security the EU has emphasised the need to apply a regime strategy. Being aware of the EU's capabilities, Smith underlines the dissimilar aspects of nominal power represented by the two actors, i.e., soft and hard. This very fact defines the means to be used by both actors to produce desired outcomes within the context of a competitive strategic relation.

In its conclusion, Nicholas Ross Smith builds upon his "layers" of analysis (historical, empirical, and theoretical) to provide three alternative scenarios for the future, based on the way both actors interact within a clearly defined spatial dimension, where their interests overlap. Ukraine is a crucial part of this interaction space. The Best Case Scenario, the Worst Case Scenario, and the Likely Case Scenario represent alternative outcomes based on a mixture of options to be defined by alternative interaction modes and their accommodating capacity.

The Best Case Scenario points to Ukraine's free choice of moving on with its strategic relation with the EU and NATO. Ross indicates the rather unrealistic nature of this outcome, yet, defines clear prerequisites for a compromise among Russia, the EU and Ukraine under the impact of NATO's expanded mission.

The Worst Case Scenario depicts a new Cold War environment and builds upon antagonism between Russia and NATO as well as on the formation of a heavily securitised relation. This would affect Ukraine and would most likely lead to its *de facto* and *de jure* parcelisation. In this case, the country would be a frog under the battling buffaloes.

To the author, the Likely Case Scenario seems the most realistic, since it meets the security needs and fulfils the strategic priorities of the EU, Russia, and NATO, at least on a minimum common denominator ground. According to this accommodating pattern, Ukraine will serve as a buffer state, thus allowing Eastern Europe to have a bipolar element, a goal that does not create a security dilemma for Moscow. For Ross-Smith, this scenario is "the least costly to the EU and Russia" and eases tensions in the common neighbourhood territory. His evaluation is based on the assumption that the West has somehow accepted the Finlandisation of Ukraine, since it is reluctant to move on to actual military projection. Eventually, Ross-Smith realises that the complexities of international politics make it impossible to provide sound prediction patterns.

guide for authors

The articles should be written as follows:
(1) Papers must be in English.

(2) Papers for publication (two copies) should be sent to:

Submission of a paper will be held to imply that it contains original unpublished work and is not being submitted for publication elsewhere. The Editor does not accept responsibility for damage or loss of papers submitted. Upon acceptance of an article, author(s) will be asked to transfer copyright of the article to the publisher. This transfer will ensure the widest possible dissemination of information.

(3) Papers will be considered in any form, but authors of papers accepted for publication will be expected to provide a final copy conforming to the general style of the Journal as outlined in notes 4 through 13 below.

(4) Manuscripts should be 1,5 spaced, with wide margins, and printed on one side of the paper only. All pages should be numbered in sequence. Titles and subtitles should be short. References, tables, and captions for the figures should be printed on separate pages.

(5) The first page of the manuscript should contain the following information: (i) the title; (ii) the name(s) and institutional affiliation(s) of the author(s); (iii) an abstract of not more than 100 words. A footnote on the same sheet should give the name, address, and telephone and fax numbers of the corresponding author [as well as an e-mail address].

(6) The first page of the manuscript should also contain at least one classification code according to the Classification System for Journal Articles as used by the Journal of Economic Literature; in addition, up to five key words should be supplied.
The classification system used in JEL can be found at:
http://www.aeaweb.org/journals/jel_class_system.html.

(7) Acknowledgements and information on grants received can be given in a first footnote, which should not be included in the consecutive numbering of footnotes.

(8) Footnotes should be kept to a minimum and numbered consecutively throughout the text with superscript Arabic numerals.

(9) Displayed formulae should be numbered consecutively throughout the manuscript as (1), (2), etc. against the right-hand margin of the page. In cases where the derivation of formulae has been abbreviated, it is of great help to the referees if the full derivation can be presented on a separate sheet (not to be published).

(10) References to publications should be as follows: 'Smith (1992) reported that...' or 'This problem has been studied previously (e.g., Smith et al., 1969)'. The author should make sure that there is a strict one-to-one correspondence between the names and years in the text and those on the list. The list of references should appear at the end of the main text (after any appendices, but before tables and captions for figures). It should be double spaced and listed in alphabetical order by author's name. References should appear as follows:

For monographs
Sen, A., 1970, *Collective Choice and Social Welfare*, San Francisco: Holden Day.

For contributions to collective works
Kornai, J., 1991, Stabilization and Economic Transition in Hungary: The Next Two Years, in J. de Melo and A. Sapir (eds.), *Trade Theory and Economic Reform: North, South and East*, Oxford: Basil Blackwell, 307-326.

For periodicals
Magdalinos, M., 1990, "The Classical Principles of Testing Using Instrumental Variables Estimates", *Journal of Econometrics,* 44, 241-279.

Note that journal titles should not be abbreviated.

(11) Illustrations will be reproduced photographically from originals supplied by the author; they will not be redrawn by the publisher. Please provide all illustrations in quadruplicate (one high-contrast original and three photocopies). Care should be taken that lettering and symbols are of a comparable size. The illustrations should not be inserted in the text, and should be marked on the back with figure number, title of paper, and author's name. All graphs and diagrams should be referred to as figures, and should be numbered consecutively in the text in Arabic numerals. Illustration for papers submitted as electronic manuscripts should be in traditional form.

(12) Tables should be numbered consecutively in the text in Arabic numerals and printed on separate sheets.

(13) Accepted papers should be submitted in electronic form in a storage media (i.e. CD, DVD, USB, etc.) with accompanying manuscript. Electronic manuscripts have the advantage that there is no need for re-setting of text, thereby avoiding the possibility of introducing errors and resulting in reliable and fast delivery of proofs. The preferred format is either .doc or .docx. Make absolutely sure that the file on the disk and the printout are identical.

(14) Page proofs will be sent to the corresponding author. Proofs should be corrected carefully; the responsibility for detecting errors lies with the author. Corrections should be restricted to instances in which the proof is at variance with the manuscript. There are neither submission fees nor page charges.