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 11 | No 1 | SPRING 2013

web site: http://www.asecu.gr
ISSN 1109-8597
ISSN On line: 1792-3115

ASECU

FUNDING INSTITUTION
UNIVERSITY OF MACEDONIA
THESSALONIKI, GREECE

SEEJE
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ISSN 1109-8597
ISSN On line: 1792-3115
Thessaloniki, Spring 2013

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aim and scope of ASECU

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ASECU South-Eastern Europe Journal of Economics 1 (2013) 7-36 SEEJE

TACKLING THE UNDECLARED ECONOMY IN CROATIA

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Abstract

To evaluate how undeclared work is being tackled in Croatia this paper reports an e-survey and in-depth interviews with key stakeholders in Croatia. It is revealed that, compared with the European Economic Area countries, Croatia has a weak institutional infrastructure for tackling undeclared work and pursues a narrower range of policy measures. The outcome is a call to develop a single body to better coordinate actions to tackle the undeclared economy in Croatia and for a shift towards an approach that seeks to provide gateways to formalisation. Furthermore, Croatia needs to modernise its work and welfare regime through higher levels of state expenditure in the labour market and social protection, coupled with redistribution via social transfers so as to construct a more equal society.

JEL Classification: E26, O17, H10, H26, K42, K2
Keywords: Informal Economy, Undeclared Work, Shadow Economy, Underground economy, Croatia, Europe

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Introduction

In order to provide a systematic overview of how the undeclared economy is being tackled in Croatia in comparison to the European Economic Area (EEA) the following issues are addressed in this paper: the extent of undeclared work in Croatia and how it compares with the EEA; the institutional structures and policy approaches employed in Croatia for tackling undeclared work and how this compares with the EEA; the range of policy measures implemented in Croatia compared to those adopted in the EEA, and exploring what should be done to improve the fight against undeclared work in this country.

Accordingly, the paper is organised so that the review of institutional structures, policy approaches and available measures for tackling the undeclared economy are presented first along with a discussion of those that have been implemented across the EEA. Following this, the second section is focused on the methodology employed to evaluate the institutional structures, policy approaches and measures adopted in Croatia, succeeded by the findings. Finally, a section synthesising the findings is presented including a discussion of the ways forward for Croatia with regard to what could be done to tackle the undeclared economy more effectively in this country.

Firstly, it is important to define what is understood by undeclared work. Although the phenomenon is variously denoted by 45 adjectives, including 'informal', 'cash-in-hand', 'underground', 'hidden' and 'shadow' and 12 nouns such as work, employment and economy (Williams 2004; Nadin and Williams 2012), a firm consensus exists in terms of the type of activity that is to be included and excluded whilst discussing this form of work. The widely, though not officially, accepted definition within the European Union includes 'productive activities that are lawful as regards their nature, but are not declared to the public authorities, taking into account the differences in their regulatory systems between Member States' (European Commission 2007, p2). Endeavours within the undeclared economy are on the fringes of the law and are therefore differentiated from criminal activities such as drug trafficking, people smuggling and money laundering. Furthermore, non-cash exchanges and subsistence production that is not exchanged is not encompassed by the term.

Settling the Scene: Tackling Undeclared Work in Europe

The focus on measuring the magnitude of undeclared work is widespread within the undeclared work literature. Consequently, the area has constructed copious estimates of the size of the undeclared economy using various indirect and direct measuring methods (Jutting and Laiglesia 2009; OECD 2002; Schneider 2011, 2012; Schneider and Enste 2002; Thomas 1992; Williams 2004, 2006). The issue of tackling undeclared work has remained a marginal topic. Recently, however, it has attracted interest causing a small but growing body of literature to surface. Hence, a review of the available information, of how the fight against undeclared work is organised institutionally in Europe, and the policy approaches and measures used by European countries when tackling undeclared work, is presented in this section.

Academics such as Feld and Larsen (2012) and Williams (2005) have written about the ways in which particular countries approach the undeclared economy and how they may come up with policies to increase the disincentives to people engaging in undeclared work. This work, however, falls short of a comparative analysis taking into account multi-nation cross-examination. Dekker *et al.* (2010), however, did just that, and evaluated at length the efforts of 31 European countries in their combat against undeclared work, and more specifically, the institutional organisation of those nations. Their findings showed that many nations (74%) did not have either a central committee or central agency responsible for the efforts to reduce undeclared work. (Germany and France with an agency and 6 countries including Italy, Slovenia and the Czech Republic with a central committee) The remainder of the studied countries were more-decentralised, either with the tax offices taking the bulk of responsibility, as is the case in many Nordic countries, or the Labour Inspectorate, seen in other Eastern and Southern European countries.

Concerning the introduction and implementation of policy, there seem to be two distinct areas of focus. Countries may choose to either adopt an incentive scheme focused around the tax system, encouraging individuals into legitimate work as they are more highly rewarded for it (the enabling approach), or they may increase the disincentives of being found to be engaging in the undeclared economy. These two approaches are quite highly contrasted, with the latter increasing the search for workers or businesses failing to declare income, and then increasing penalties and punishments on these persons. Hasseldine and Li labelled (1999) this approach economic deterrence, compared with the tax method, which they labelled as 'fiscal psychology'; to put it more simply, 'the Stick vs. the Carrot' (Small Business Council, 2004).

Table 1 provides a summary of the methods and measures used by these two contrasting approaches. The deterrence principle focuses on an individual behaving as a rational being, somebody who weighs up the pros and cons of a decision before choosing which option to go for (Allingham and Sandmo, 1972). Individuals will assign an 'is it worth it' weighting to disincentives such as a criminal record, or a prison sentence, as well as obvious weightings such as a cash fine. Their chances of being caught will also be taken into account, therefore to increase deterrence individuals must realise that there is a much higher chance of being found to be engaging in undeclared work, whereas if there is absolutely no chance of being caught, many more would practice the behaviour. On the alternative side, individual, rational economic actors will think of the legitimate, declared side of the economy as more positive if the fiscal policy is more accommodating. For example increasing the VAT threshold may see business owners declaring more of their earnings. As Allingham and Sandmo (1972) describe it, policy makers should impose a 'negative reinforcement approach', making sure that everyone knows that the illegal behaviour will be caught and punished severely.

On the other hand, academic research into the approaches of policy makers to undeclared work has led to an increase in backing for the enabling method. Kagan and Scholz (1984) believe that viewing the public as 'social actors' is a more realistic approach. They believe that people, by their nature, will comply with the law and those that don't have been forced out of doing so by the tax system. Murphy (2005) offers the hypothesis that the tax authorities should be 'enablers', who offer the appropriate incentives to individuals who wish to declare earnings. The European Commission (2007) backs this motivation as does the Small Business Council (2004). In the long term individuals will seek to maximise their utility by following laws and engaging in legal activity as much as they can.

Table 1. Policy approaches towards undeclared work

Approach	Method	Measures
Deterrence	Improve detection	Data matching and sharing Joining-up strategy Joining-up operations
	Penalties	Increase penalties for evasion
Enabling compliance	Preventative	Simplification of compliance Direct & indirect tax incentives Smooth transition into self-employment Introducing new categories of work Micro-enterprise development
	Curative	Purchaser incentives - service vouchers - targeted direct taxes - targeted indirect taxes Supplier incentives - society-wide amnesties - voluntary disclosure - business advisory & support services
	Fostering commitment	Promoting benefits of declared work Education Peer-to-peer surveillance Tax fairness Procedural justice Redistributive justice

Source: derived from Williams and Renooy (2009)

Governments have a choice of three methods when aiming to achieve a reduction in the levels of undeclared work. The first is a fiscal system which encourages people to behave legally from the beginning, Williams and Renooy (2008) suggest that this will stop the need for individuals to stray from the declared economy. Another approach is to incentivise a switch from not declaring earnings to declaring them, amnesties for those wishing to switch, for example. A third option is the soft policy approach, such as redistributional justice, or education on tax immorality.

Williams and Renooy, in a 2009 paper, explained that the deterrence approach was still the most popular policy choice in 2001, and that the first approach, focusing on a fair and engaging tax system, was rarely used across Europe. This bias towards the deterrence approach continued throughout the early part of the decade; however, by 2005, more member states were committing to enabling approaches. Tax systems began to focus more on the preventing of individuals engaging in undeclared work while the softer, educational approaches, encouraging people to look at tax morality, were lacking. Indeed, beyond the 15 original states of the EU, the deterrence method was still a hugely popular and dominant policy. In cases where an enabling approach was adopted, it was confined mostly to preventive methods as softer measures engendering higher commitment to tax morality remained largely absent.

To find out whether a wider range of approaches and methods were being used, Dekker *et al.* (2010) surveyed senior officials involved in the fight against undeclared work from either labour inspectorates, tax offices, social security administrations, trade unions, employer representative organisations and other relevant agencies such as customs, border police and immigration in the 31 countries of the European Economic Area (EEA). Ranking the four approaches from most important to least important in their country, 57 per cent stated that the deterrence approach was the most important in their country and only 43 per cent considered the enabling approach as the most important. On the other hand, when asked to order the approaches from the least important, 84 per cent declared enabling approaches and merely 16 per cent the deterrence approach. This clarifies that whilst there is a continuing shift towards adopting enabling approaches, the majority of member states remain entrenched in a deterrence approach that pursues the eradication of undeclared work.

Although in 2010 all 31 EEA countries were continuing to use deterrence methods it is evident that there has been an increase in the range of methods and measures being adopted since the onset of the recession. This is shown through a greater implementation of preventative, curative and commitment methods than in the period preceding the recession. By 2010, 90 per cent of European Economic Area (EEA) countries used one or more preventative policy measures, 64 per cent of countries adopted one or more curative measures and 69 per cent had implemented commitment measures (Dekker *et al.*, 2010). Therefore, it is clear that although the deterrence approach is still widely used, the enabling approach has started to be more broadly introduced.

Thus far, however, there have been no evaluations of either how the fight against undeclared work is organised institutionally or the policy approaches and measures that are being used in Croatia. The current paper seeks to fill this gap.

Methods

In order to identify the policy approaches and measures adopted in Croatia, as well as to identify how the fight against undeclared work is being organised more generally, we first carried out a comprehensive literature review including academic, governmental and social partners' statistical sources. This involved a review of surveys of undeclared work in Croatia, a desk-based survey of the institutional structures employed to fight undeclared work in Croatia encompassing both published and 'grey' literature and a desk-based survey of policy measures. This, however, resulted in large gaps in knowledge of both the organisation of the fight against the undeclared economy and the policy approaches and measures being implemented.

In order to fill the gaps in understanding as well as to provide up-to-date information and further detail an e-survey was conducted [see Appendix 1] gathering data from key stakeholders.

Based on Dekker *et al.*'s (2010) survey instrument used to study EEA countries the information sought was: the characteristics of the current national institutional framework in Croatia; the existing policy measures used; their perceptions of the importance of each policy measure in the overall approach adopted; their perceived best practices in this field, and the usefulness of various possible policy options. A total of some 9 responses were obtained from senior stakeholders. The participants were chosen by contacting relevant institutions and asking for knowledgeable representatives to participate. Although there are limitations with such a number of responses the key aim was to get representatives from government departments involved in the fight against undeclared labour, as well as social partners such as employer's associations and expert academics. Additionally we obtained the responses of a World Bank economist.

Subsequent to the web survey three in-depth semi-structured interviews were carried out with a sample of the stakeholders who were asked to comment on the results of the e-survey and to provide any additional information they had with regard to the country's fight against undeclared work. This was done in order to obtain additional information to satisfy any gaps or disparities on existing national institutional frameworks and policy measures adopted in Croatia as well as to seek richer in-depth understanding of the effectiveness and importance of the various approaches being implemented. The respondents were asked to comment on each policy approach that had been outlined as present (from the e-survey) in Croatia's fight against undeclared work.

Finally, in order to validate our findings, a workshop was undertaken in November 2012 in Zagreb with experts and representatives of key stakeholders involved in the fight against undeclared work in Croatia. The results from the study are reported below.

Findings

To contextualise the findings a brief outline of the extent and nature of the undeclared economy in Croatia is provided, followed by the results of the organisation of the fight against undeclared work in Croatia relative to other EEA countries and an evaluation of the adopted policy approaches and measures, along with broader findings that reveal the size of the undeclared economy to be indivisibly connected to the type of work and welfare that prevails in a country. This provides the necessary material to yield some conclusions of what needs to be done to more effectively tackle the undeclared economy in Croatia.

Extent and nature of the undeclared economy in Croatia

With a population of 4,430,003, Croatia is defined by the World Bank as a 'high income' country with a GNI per capita of US$13,760 (World Bank Doing Business Survey, 2012). In September 2012, the monthly minimum wage was 2,814 kuna, the average gross monthly earnings/person in paid employment was 7,958 kuna and monthly net earnings/person in paid employment was 5,499 kuna. The registered unemployment rate in October 2012 was 19.61% (Croatian Bureau of Statistics, 2012).

Extent of undeclared work

In Croatia, as in other countries, many different estimates of the size of the undeclared economy exist, each using different measurement methods. It is important, therefore, to be aware of the measurement method underpinning any estimate. Table 2 reports the findings of the World Bank Enterprise Survey 2007, which interviewed 633 firm owners, and uses the same questions across many countries. This reveals that 98.1% of the firms surveyed reported that they were formally registered when they started operations and the 1.9% of firms that were not registered operated on average for just 1.1 years without formal registration. Nevertheless, evidence that many formal and informal businesses operate on an undeclared basis is provided by the fact that 31.7% of firms report that they compete against unregistered or informal firms and 25% report that the practices of informal sector competitors are a major constraint on their business.

A further measure of the extent of the undeclared economy is provided by Schneider (2011), who measures its size as a proportion of GDP using his Multiple Indicators Multiple Causes (MIMIC) method[1]. Figure 1 compares the size of the undeclared economy in Croatia with its EU-27 counterparts. It reveals that the undeclared economy in Croatia

1. As with the MIMIC estimation procedure one obtains only relative values, with the help of the currency demand approach, for a few countries (Austria, Germany, Poland and Switzerland). These values have been calibrated into absolute ones.

is equivalent to 30.4% of GDP and as such, is larger than in all EU-27 member states with the exception of Bulgaria. However, other researchers, such as Klaric (2011), dispute such high figures of undeclared work within Croatia. Klaric (2011), using the MIMIC method, finds that in 2009 the annual undeclared work income relative to the official GDP was 4.18%. However, for the current paper the limitation of Klaric's method lies in this statistic not being compared with that of other countries.

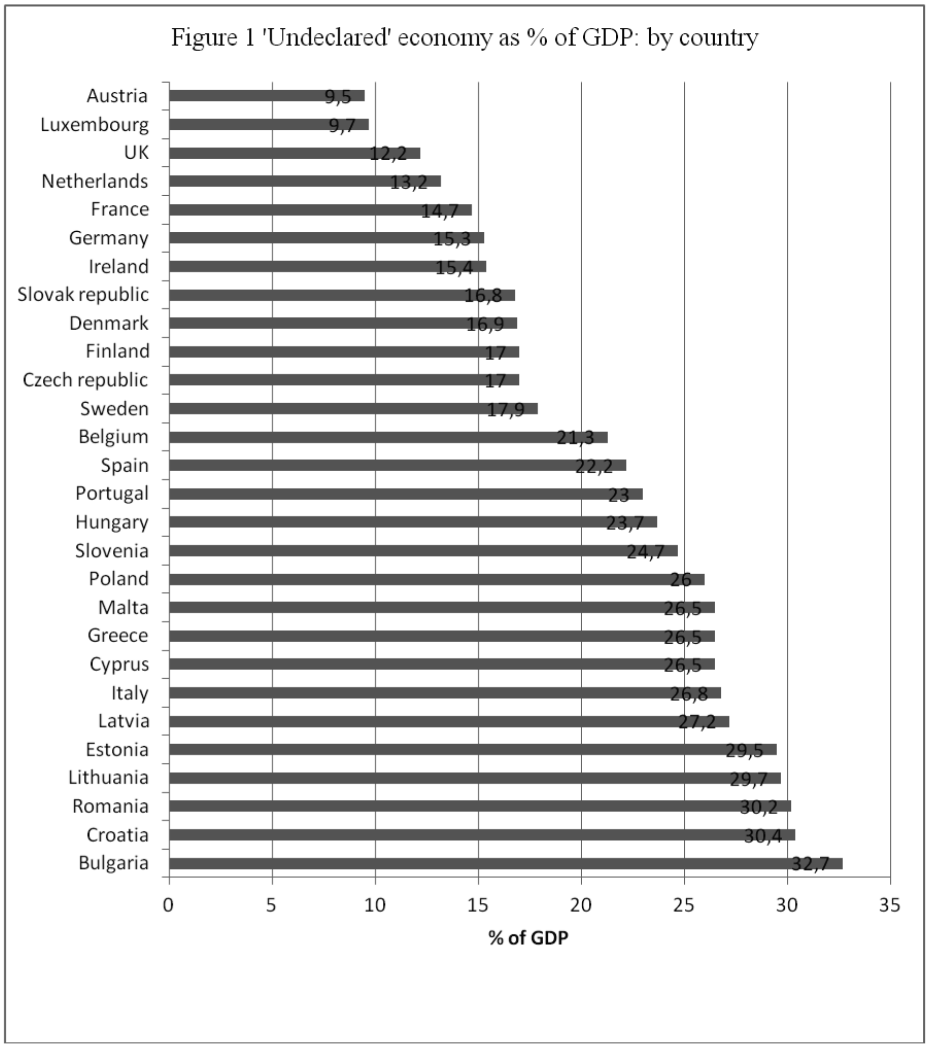
Table 2. Magnitude of Undeclared Work in Croatia

N=633	**Croatia**	**Eastern Europe and Central Asia**	**World**
% of firms formally registered when started operations in country	98.1	96.3	87.7
Number of years operated without formal registration	0	1.1	0.9
% of firms competing against unregistered or informal firms	31.7	45.2	56.3
% of firms identifying practices of competitors in the informal sector as a major constraint	25.0	28.7	31.6

Source: World Bank Enterprise Survey 2007

Examining the trends over time in the magnitude of the undeclared economy, Schneider (2011: 42) finds that it has slightly reduced in size from 33.8% of GDP in 1999, through 32.1% in 2003 to 30.4% in 2007.

Care, however, needs to be taken with such estimations of the size of the undeclared economy that result from indirect measurement methods. Using proxy indicators and/or seeking statistical traces of undeclared work in data collected for other purposes, there are often marked variations in the estimates of its size. As the Institute for Market Economics (2002) shows, summarised in Table 3, at any one time different methods can produce different estimates of the size of the undeclared economy as well as different views of its trajectory. For example, while the approach which seeks discrepancies in the national accounts (Madzarevic and Mikulic, 2001) reveals a sharp decline in the size of the undeclared economy between 1995 and 2000, monetary methods show a slight increase over the same period, as does the electricity consumption approach (Sosic and Faulend, 2001).



Source: data from Schneider (2011)

Table 3. Estimate of the Size of the 'Undeclared Economy' 1990-2000: % of GDP

Method	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Discrepancy method	14.37	28.15	29.40	36.88	25.45	18.38	16.31	11.38	9.12	8.41	6.81
Monetary-Cash deposits						25.0	24.7	29.2	29.8	34.0	25.3
Monetary–foreign currency in circulation						25.0	22.0	26.1	25.5	24.9	25.8
Electricity consumption method						25.0	24.8	24.0	26.3	29.8	26.5

Source: Institute for Market Economics (2002)

Nature of undeclared work

Various surveys highlight how the undeclared economy is concentrated in some sectors of the economy more than others (Bicanic and Ott, 1997; Institute for Market Economics, 2002; Mikulic and Madzarevic, 2001). Comparing the undeclared economy in agriculture, industry and trade over the period 1990-1999, Bicanic and Ott (1997) note that while the undeclared economy in agriculture was somewhere between 6.8-16.9 per cent of GDP between 1990-1999, in industry it was rather lower, ranging from 2.3 per cent in 1996 to 5.2 per cent in 1998. In trade, meanwhile, the undeclared economy was far more prevalent although the trends over time in its relative size were identical to industry, with a sudden growth in the undeclared economy in retailing during the 1990-1993 period (to almost 60 per cent of trade as a whole), followed by a sudden fall in 1993-1994 (to around 35 per cent) and then a mild decline or stagnation from 1995 until 1999. Overall between 1990 and 1999, undeclared work was reducing in trade and stagnating in agriculture, but rising in industry. Their argument is that the process of transition into a market economy was variable across sectors, with the transition being most rapid in trade and slowest in industry. Although many studies have been carried out more recently to estimate the size and extent of the informal economy in Croatia, there is a lack of research investigating its nature.

Svec (2009) finds that the labour activity rate is inversely proportional to the estimate of people unemployed in the undeclared economy. In Croatia, therefore, as the activity rate falls, the undeclared employment grows. This suggests that the population switches between the formal and informal economy. However, in order to make further conclusions as to why this happens we would need more qualitative data investigating the issue.

To evaluate the distribution of the undeclared economy across sectors in Croatia in a manner that is comparable cross-nationally, the World Bank Enterprise Survey can be analysed. In 2007, and as Table 4 reveals, businesses in the food sector (i.e., agriculture and allied industries) were most likely to witness competition from unregistered or informal firms, followed by manufacturing and retailing. Examining whether the activities of informal or unregistered businesses were a major constraint on formal businesses, meanwhile, the finding is that this was most widely felt in the food sector, followed by other services and then the garment industry. Although retail businesses witnessed competition from undeclared enterprises, therefore, they did not perceive these undeclared competitors as a major constraint on their operations.

Table 4. Prevalence of the Undeclared Economy in Croatia: by Sector, Firm Size, Location, Exporting Status and Ownership

N= 633	**% of firms competing against unregistered or informal firms**	**% of firms identifying practices of competitors in informal sector as a major constraint**	**% of firms formally registered when started operations in country**	**Number of years operated without formal registration**
All	31.7	25.0	98.1	0
By sector:				
Food	54.5	42.2	99.8	0
Garments	25.1	24.3	100.0	0
Fabricated metal products	26.1	12.3	100.0	0
Other manufacturing	38.4	14.3	97.8	0
Retail	35.7	13.8	100.0	0
Other services	25.4	30.1	97.1	0
By firm size:				
Small (5-19)	32.5	31.3	99.4	0
Medium (20-99)	33.0	19.8	96.3	0
Large (100+)	20.0	11.8	98.9	0.1
By Location:				
Zagreb	53.0	33.1	97.9	0.1
North	41.2	6.5	100.0	0
Slavonia	40.8	40.6	100.0	0
Dalmacija	17.0	29.2	100.0	0
Istra I Hrvatsko Primorje	12.3	4.1	90.0	0.1
Like I Banovina	25.6	33.1	100.0	0
By exporting status:				
Direct exports 10%+ of sales	18.8	7.2	97.8	0
Non-exporter	34.3	28.1	98.1	0
By ownership:				
Domestic owned	32.6	25.9	98.1	0
Foreign owned	10.2	5.2	98.3	0

Source: World Bank Enterprise Survey 2007

Socio-economic, business and spatial variations

Table 4 also reveals that large firms appear to be less affected by the existence of unregistered or informal businesses than smaller and medium sized businesses. While one-third of SMEs assert that they compete against informal or unregistered firms, only one-fifth of large firms assert that this is the case. Indeed, small businesses are far more likely than medium or large businesses to assert that informal or unregistered businesses are a major constraint. Related to this, it is non-exporting businesses and domestically-owned businesses who are more likely to witness competition from informal or unregistered businesses, and who are more likely to state that the undeclared economy constrains their business than exporting and foreign-owned businesses.

There are also significant spatial variations in the prevalence of the undeclared economy. While 53 per cent of businesses in Zagreb state that they compete against unregistered or informal businesses, 41.2 per cent in the North and 40.8 per cent in Slavonjia, this figure is just 25.6 per cent in Lika and Banovina, 17 per cent in Dalmacija and 12.3 per cent in Istra and Hrvatsko Primorje.

Types of undeclared work

No known contemporary studies have sought to evaluate the prevalence of different types of undeclared work in Croatia. For example, it is not known what proportions of the undeclared economy is composed of 'envelope wages', waged informal employment, informal self-employment and paid favours. This will require investigation in future studies. One way to achieve this would be to replicate the 2007 Eurobarometer survey that covered the EU-27 in Croatia (European Commission, 2007b).

Barriers to formalisation

The annual World Bank *Doing Business* surveys provide one of the few data sources on the barriers to formalisation in Croatia. These provide data (which is cross-nationally comparable, given that the survey is annually conducted in 183 countries) on how easy or difficult it is for a local entrepreneur to open and run a small to medium-size business when complying with relevant regulations. It measures and tracks changes in regulations affecting 10 areas in the life cycle of a business: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency. Consequently, the survey allows an understanding of the broader business environment and assesses a particular set of issues that aid the explanation of undeclared activity, thereby giving policy makers an insight into potential areas of reform. Examining quantitative estimates of the ease of doing business in each of these ten areas and comparing the findings with 183 other countries, the finding is that, overall, Croatia was ranked 80th out of 183 in 2012 in terms of the ease of doing business (the

EU-27 overall as a composite would be ranked 38th) and 79th in 2011. The implication is that it is more difficult to open and run a small business in Croatia than in the EU-27 as a composite, although Croatia does perform better on some aspects than others relative to other countries.

Take, for example, starting a business. Evaluating how easy it is to start a business, Croatia is ranked 67th out of 183 countries, whilst the EU-27 as a composite would be ranked 66th. Starting a business in Croatia requires 6 procedures, takes 7 days, costs 8.6 per cent of income per capita and requires paid-in minimum capital of 13.8 per cent of income per capita. In part, this was because in 2011, Croatia has made it easier to start a business by allowing limited liability companies to file their registration application with the court registries electronically through the public notary (World Bank Doing Business Report Croatia 2012).

Examining the ease of paying taxes, meanwhile, Croatia stands at 32nd in the ranking of 183 economies, whilst the EU-27 as a composite is 71st, suggesting that paying taxes is easier in Croatia than the EU-27 as a whole. On average, firms make 17 tax payments a year, spend 196 hours a year filing, preparing and paying taxes and pay total taxes amounting to 11.5% of profit. Although the World Bank Doing Business Survey states that no reforms have occurred in the 2010 to 2012 period, this is not the case. In 2009, the standard VAT rate in Croatia was increased from 22% to 23% and a 'crisis tax' was introduced, levied on the net income of households and the abolition of all tax relief in the personal income system. This had a negative impact in citizens' minds on operating formally but by November 2010 the crisis tax was revoked. Furthermore the government changed the law on personal income tax, decreasing the tax brackets from four to three, reducing the lowest tax rate (from 15 per cent to 12 per cent). This was done in order to lower the tax burden for the employed.

Comparing Croatia with the EU-27, moreover, Grdoviζ Gnip and Tomiζ (2010) show that Croatia has a higher tax burden and a higher employment protection legislation index. They also point out that the greatest impact of the overall tax burden falls on Croatian workers in the lower income brackets. Therefore, although the government has started to take some action to reduce the tax burden in an attempt to make formalisation easier, this is perhaps an area for further improvement in Croatia, despite its apparently higher ranking than the EU-27 in the World Bank *Doing Business* surveys. The aforementioned surveys are, however, limited in scope with regard to measuring barriers to formalisation and therefore more studies should be carried out in Croatia that seek to investigate the nature of such barriers and obtain a broader perspective on policy challenges.

Organisation of the fight against undeclared work

Analysing how the fight against undeclared work is organised in 31 European countries, Dekker *et al.* (2010) find that in eight countries (26%) there is either a single agency responsible for the fight against undeclared work or a central coordinating committee responsible for ensuring coordinated action by the multifarious departments who have a stake in tackling undeclared work. This is not true of Croatia, which does not have a single agency or coordinating committee responsible for ensuring joined-up action by the array of departments involved in tackling undeclared work. Furthermore, there is no lead department responsible for tackling undeclared work.

In Croatia, different governmental organisations are responsible for different aspects, including the Ministry of Finance, Ministry of Labour and Pension System, State Inspectorate, Tax Administration, Croatian Employment Service, Ministry of Tourism, Ministry of Agriculture and Customs Administration. These government departments largely have their own separate targets for undeclared work. From the interviews conducted it was found that the responsibilities of each department were not clearly defined over the long term but varied with projects.

Despite responsibility for tackling undeclared work being distributed across numerous departments and the targets pursued being largely department-based rather than shared, there are individual examples of where operational cooperation and coordination occurs, such as joint inspection visits. It was also found from our e-survey and interviews that data sharing across departments has been improved since the introduction of individual identification numbers for citizens. Furthermore, occasionally objectives and projects run across departments and shared plans and goals are adopted. This is exemplified with the shared goal of informing the public of the pitfalls of undeclared work and the benefits of formalising.

The role of social partners

It is important to emphasise the crucial role that social partners can play with regard to fighting undeclared work. They are often instrumental with preventative action such as information campaigns or initiatives to improve education and training. Furthermore, they have an important part to play in implementing social legislation as well as aiding the monitoring carried out by relevant authorities.

In Croatia the involvement of social partners occurs through the Economic and Social Council (ESC), established in 1994 to enable tripartite social dialogue between the government, employers and trade unions. To further improve this, the Office for Social Partnership was introduced in 2001. The ESC has had a different number of working bodies over the years. Currently, since the new Agreement on establishing the ESC was signed in February 2012, the ESC has 5 permanent working bodies – the Committees. The union associations that participate are the Union of Autonomous Trade Unions of Croatia (SSSH), the Independent Croatian Trade Unions (NHS), the Croatian

Trade Union Association (HUS), the Association of Workers' Trade Unions of Croatia (URSH) and the Association of Croatian Trade Unions (Matica). Although there are more than 500 registered trade unions in Croatia, these five major associations cover approximately 90 per cent of trade union membership in the country. The dominant employers' organisation is the Croatian Employers' Association (HUP), established in 1993.

Despite the establishment of this formal institutional arrangement in the form of the ESC and the Office of Social Partnership, there remains a relatively weak culture of social dialogue (Milicevic - Pezelj, A., 2011). As Šokčević (2009: 322) states, there exists "a deep division in values and interests between actors of collective bargaining". This is exemplified by the trade unions withdrawing from the ESC in 2010 for six months in protest at the weak dialogue. The reason was that there was no real dialogue. In their opinion, they were given a short time to study the materials sent out by state bodies and they were not satisfied with the voting procedures. However, new Rules of Procedure have been adopted to ensure restoration of the work of the ESC in the sense that there is no longer voting on each item on the agenda. When situations arise where consensus is not reached, social partners are able to state their disagreement which will then be published on the website of the Independent Service for Social Partnership.

Policy approach and measures

As has been mentioned and displayed in table 5, despite the call by the European Commission to transform undeclared work into declared employment, most countries remain entrenched in a repressive approach that seeks to stamp out undeclared work. The view that undeclared work needs to be transferred into the declared realm is far from being widely accepted.

Table 5. Stakeholder Opinion of the Relative Importance Accorded to Different Types of Policy Measure in their Country

% citing (% for 5 EU Candidates in brackets):	Most important	2nd Important	Least important
Repression measures	57% (80%)	17% (20%)	16% (0%)
Preventative measures	19% (20%)	46% (60%)	23% (0%)
Curative measures	14% (0%)	19% (20%)	32% (60%)
Fostering commitment to declared work	10% (0%)	18% (0%)	29% (40%)

Source: Dekker *et al* (2010)

This is similarly the case in the 5 EU Candidate Countries (CC5). Indeed, in the CC5, the widespread view is that repression measures are accorded the greater importance in their country when tackling undeclared work. This is similarly the case in Croatia. Interviews with government officials and social partners strongly confirm that deterrence remains the dominant policy approach, although there is a recognition that a much wider range of measures are being introduced over time, even if they are not yet accorded the same importance as deterrence in the fight against undeclared work.

Is it the case, therefore, that measures are being pursued in Croatia similar to those of the EEA countries? As Table 6 displays, all 31 EEA countries were continuing to use repressive measures aimed at stamping out undeclared work, with all seeking to improve detection and 93% using penalties and/or sanctions. However, they are also pursuing measures to change the 'benefits' side of the equation by making it easier and more beneficial to operate in the declared economy, as called for by the European Commission; 90% adopt one or more preventative policy measure, although the range of measures used is relatively narrow beyond simplifying compliance, and 64% use one or more curative measures, although again the range used is narrow beyond the use of targeted direct tax incentives (e.g., income tax relief/reduction/subsidy schemes). Moreover, there has been recognition of the need to shift from purely the 'harder' policy approach which changes the cost/benefit ratio confronting suppliers and purchasers and towards a 'softer' approach that seeks to move away from compliance and towards engendering a commitment to tax morality; 69% of the 31 countries adopt some commitment measure.

Comparing the range of measures used in Croatia with the EEA, Table 6 reveals that a full range of deterrence measures are similarly used. Although enabling measures are also starting to be used, until now it has been largely preventative measures that have been adopted. Curative measures that seek to transform undeclared work into declared work are particularly scarce compared with the EEA whilst policies aimed at fostering commitment to declared work, although introduced, are quite recent measures and their impact is not yet known.

Over the past few years, one of the priorities of the Croatian government has been to update the laws and clarify the conditions that businesses and persons must meet to be fully legal. Steps have been taken to improve labour relations within a stronger regulatory framework (World Trade Organisation, 2010). It was found from our interviews and the validation workshop that the majority of updates to the laws, however, have adopted a deterrence focus, signalling the continuing prominence given to the repressive approach. For example, the powers of government inspectors have been expanded and inspections are increasing annually as well as intensified during seasons of increased working (e.g. summer in the region of Dalmacija). A coordination of various inspection bodies in this regard has been introduced to ensure greater efficiency.

Table 6. Policy measures used in Croatia and the EEA to tackle undeclared work

Policy measure	**Croatia**	**% of 31 European nations using measure:**
REPRESSION		
Penalties:		*93*
Administrative sanctions for purchasers/companies	✓	87
Administrative sanctions for suppliers/employees	✓	83
Penal sanctions for purchasers/companies	✓	74
Penal sanctions for suppliers/employees	✓	52
Measures to improve detection:		*100*
Data matching and sharing	✓	83
Workplace inspections	✓	100
Registration of workers prior to starting work or on first day of work	✓	74
Coordinating strategy across government	✓	57
Certification of business, certifying payments of social contribution and taxes	✓	65
Use of peer-to-peer surveillance (e.g. telephone hotlines)	✓	39
Coordination of operations across government		61
Coordination of data sharing across government		65
Mandatory ID in the workplace	✓	65
ENABLING COMPLIANCE:		
Preventative measures:		*90*
Reduce regulations	✓	48
Simplify compliance procedures	✓	87
Technological innovations (e.g. certified cash registers)	✓	43
New categories of work (e.g., for small or mini-jobs)	✓	35
Direct tax incentives (e.g., exemptions, deductions)	✓	61
Social security incentives	✓	35
Ease transition from unemployment into self-employment	✓	65
Ease transition from employment into self-employment	✓	44
Changing minimum wage upwards	✓	48
Changing minimum wage downwards		9
Training & support to business start-ups	✓	61
Micro-finance to business start-ups	✓	52
Advice on how to formalise	✓	61
Connecting pension schemes to formal labour	✓	61
Introducing supply chain responsibility		17
Restricting free movement of (foreign) workers	✓	43
Curative measures:		*64*
Stimulate *purchasers* to buy declared:		
Service vouchers	✓	26

Targeted direct tax incentives	✓	61
Targeted indirect taxes		17
Stimulate *suppliers* to formalise:		
Society-wide amnesties		9
Individual-level amnesties for voluntary disclosure		17
Formalisation advice to business	✓	30
Formalisation support services to businesses		30
Targeted VAT reductions		17
Free record-keeping software to businesses		13
Fact sheets on record-keeping		22
Free advice/training on record-keeping		22
Gradual formalisation schemes		13
Fostering commitment to declared work:		*69*
Campaigns to inform undeclared workers of risks and costs of working undeclared	✓	61
Campaigns to inform undeclared workers of benefits of formalising their work	✓	57
Campaigns to inform users of undeclared work of the risks and costs	✓	61
Campaigns to inform users of undeclared work of the benefits of declared work		52
Use of normative appeals to people to declare their activities		52
Measures to change perceived fairness of the system		26
Measures to improve procedural justice of the system (i.e., degree to which people believe government has treated them in a respectful, impartial and responsible manner)	✓	17
Measures to improve tax/social security/labour law knowledge	✓	65
Adoption of commitment rather than compliance approach (e.g., 'responsive regulation')		30
Campaigns to encourage a culture of commitment to declaration	✓	39

Nevertheless, the use of enabling measures has also increased in recent years. Akin to other EU-27 member states, incentives have been introduced to help the unemployed move into self-employment, although certain sectors are excluded - such as the hospitality industry. These provide 12 month grants ranging from €2,500 for crafts people to €3,250 for traders (Hrvatski Zavod za Zaposljavanje, 2012).

Akin to many other EEA countries, a voucher system has also been introduced. In Croatia, this has been in the agricultural sector. No evaluations have yet been conducted but if successful, the intention is to extend it to tourism, household services and other seasonal activities. This provides employees with a daily voucher for each recorded day of work and provides employers with incentives for declaring seasonal work. Under the previous law, social contributions had to be paid for the entire month even if the

weather allows the seasonal employee only five days of working. Workers must receive a minimum daily wage of 70.40 HRK (€9.40) and work no longer than a maximum of 12 hours per day. A seasonal worker can be employed for 90 days per calendar year. The penalties for violating the provisions of the act are up to 50,000HRK for legal persons and 10,000-30,000HRK for individuals (Hrvatski Zavod za Zaposljavanje, 2012). The law is simple and clear, and the process is limited in administration.

There has also been a simplification of business registration procedures akin to the 'one stop shop' principle used in many other EEA countries. The HITRO.HR business registration service enables citizens and entrepreneurs to have quicker and simpler access to information and services in one location. As part of this initiative, a multifunctional smart card (FINA e-card) has been introduced and is intended for electronic business, simplifying and speeding up business processes and eliminating unnecessary paperwork. The e-card therefore saves time and money for businesses willing to operate electronically.

Promoting a culture of commitment to tax morality has also been pursued, using campaigns in daily newspapers, on television, the internet and other media. The intention is to clarify certain procedures, new laws and policies and show that working on an undeclared basis is not profitable.

In sum, although Croatia gives prominence to deterrence measures, it is also paying greater attention to enabling policy measures. Until now, however, this has been mostly in the realm of preventative measures. The use of supply-side curative measures has been very limited, whilst the adoption of 'softer' commitment measures to improve citizens' tax morality has been recent. The lesson for Croatia, therefore, is that there needs to be greater attention paid to curative and commitment policy measures that seek to transform undeclared work into declared work.

Undeclared economies and work/welfare regimes

Changes beyond the realm of direct policy measures are needed in order for undeclared work to be tackled. As is outlined below there is evidence that the broader work and welfare regimes also affect the size of the undeclared economy in a country.

It is evident that thus far two opposing perspectives have prevailed. A neo-liberal perspective would in this case argue that undeclared economies are a direct consequence of high taxes, over-regulation and state intervention in the free market therefore advocating for countries to engage in de-regulation, tax reductions and minimal state interference. Alternatively, if considered from the perspective of social democracy, it is under-regulation that propels the undeclared economy and the solution is therefore state intervention and higher levels of social protection (Vorley and Williams, 2012).

To evaluate these rival perspectives, five indicators can be analysed that compare the impacts on the size of the undeclared economy of the more interventionist 'welfare capitalist' approach and less interventionist 'neo-liberal' approach. These are the level of implicit tax rates on labour income (Eurostat, 2007, 2011), state expenditure on interventions in the labour market as a proportion of GDP (Eurostat, 2011), the level

of state social protection expenditure (excluding old age benefits) as a proportion of GDP (European Commission, 2011), the effectiveness of state redistribution via social transfers (European Commission, 2011) and the level of intra-national equality in the society, as measured by the gini-coefficient (European Commission, 2011). For further explanation and details of data-sets and methodology, see Williams (2012a,b) and Vorley and Williams (2012).

As Table 7 reveals, there is no statistically significant correlation between the implicit tax rates on labour (i.e., the average effective tax burden on labour income) and the size of undeclared economies. Using Spearman's rank correlation coefficient (r_s) due to the non-parametric nature of the data, no statistically significant correlation is found between the size of the undeclared economy across the EU-27 and the implicit tax rates on labour (r_s=-0.266). Indeed, merely 10.2 percent of the variance in the size of the underground economy is correlated with the variance in implicit tax rates (R^2=0.1019). However, there is a statistically significant correlation between the size of undeclared economies and the level of state expenditure on labour market interventions, expenditure levels on social protection, the level of state redistribution via social transfers, and the degree to which societies are equal. In summary, the finding is that welfare regimes where there is greater labour market intervention, higher levels of social protection and redistribution via social transfers, and there is greater equality, tend to have smaller undeclared economies. This could have significant implications for Croatia. It tentatively suggests that undeclared economies will be reduced not only by pursuing targeted policy measures but also by modernising its work and welfare regime through higher levels of expenditure on state intervention in the labour market and social protection, coupled with redistribution via social transfers so as to construct more equal societies.

Table 7. Bivariate regressions of relationship between size of undeclared economy and work and welfare regimes

Country	Undeclared work as % of GDP	
	r_s	R^2
Implicit tax rate	-0.266	0.102
Lab Market expenditure	-0.599**	0.235
Social protection expenditure	-0.700**	0.467
State redistribution via social transfers	-0.642**	0.457
Inequalities (gini-coefficient)	0.448**	0.227

Data: Eurostat and European Commission publications, based on the analysis of the situation in the EU27

Note: ** Correlation is significant at the 0.01 level

Conclusions

In this paper a systematic overview of the extent and nature of undeclared work, and how it is being tackled, in the EU Candidate country of Croatia has been presented. The objectives encompassed within this have been to analyse: the scale and nature of undeclared work in Croatia, how the fight against the undeclared economy is organised and the policy approaches and measures being adopted.

Throughout the paper, a comparison of Croatia with the EU-27 is made but is done so bearing in mind the intricate nature of undeclared work and differences among countries. A call, therefore, is made for more in-depth research to be carried out within the context of Croatia, as taking into consideration that the undeclared economy is affected by the wider contextual environment creates a more holistic and intricate picture and therefore more appropriate policy recommendations.

The finding is that the undeclared economy in Croatia is equivalent to 30.4% of GDP and as such, is larger than in all EU-27 member states with the exception of Bulgaria. Nor is the undeclared economy evenly distributed in Croatia. It is most concentrated in agriculture and allied trades, followed by manufacturing and retailing. Large firms, and exporting and foreign-owned businesses, furthermore, are less affected by informal businesses and less likely to view them as a major constraint, than smaller and medium sized businesses, non-exporting and domestically-owned businesses. At present, nevertheless, it is not possible to compare who does undeclared work in Croatia, what types of work they do and for what reasons with other EU-27 member states. One way forward, therefore, might be the implementation of the 2007 Eurobarometer survey and/or the inclusion of the CC5 in any future second wave Eurobarometer survey, so as to enable a comparison of the nature of undeclared work in Croatia with the EU-27.

Turning to how the fight against undeclared work is organised in Croatia, there is no one single compliance unit/agency/organisation responsible for tackling undeclared work. Nor is there even a government department that takes lead responsibility. Instead, different governmental organisations take responsibility for different facets, including the Ministry of Finance, Ministry of Labour and Pension System, State Inspectorate, Tax Administration, Croatian Employment Service, Ministry of Tourism, Ministry of Agriculture and Customs Administration. On the whole, these departments do not have common or shared targets with regard to tackling undeclared work, and the pursuit of a joined-up approach is in its infancy so far as strategy is concerned, although there are limited examples of joining-up operations and data sharing on a cross-departmental basis. Furthermore, although formal institutional arrangements and a framework exist for the involvement of social partners, including the Economic and Social Council (ESC) and the Autonomous Service for Social Partnership, the culture of social dialogue remains relatively weak.

Finally, and similar to the EEA countries, Croatia has given prominence to the repressive approach towards undeclared work, seeking to stamp it out. Although enabling measures are starting to be used in Croatia, especially preventative measures, there is little use of curative measures, especially incentives to encourage those working undeclared to formalise, and measures to foster commitment to tax morality are fairly recent. The lesson, therefore, is that Croatia needs to pay greater attention to curative and commitment policy measures that seek to transform undeclared work into declared work. Besides such direct policy interventions, this report also provides evidence of a strong correlation between countries in which there is greater labour market intervention, social protection, redistribution and equality, and smaller undeclared economies. It is to be hoped, therefore, that the findings from this paper will help Croatia in its fight against undeclared work. If it does so, it will have fulfilled its objective.

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Appendix 1 (E-survey)

We would like to start with a few questions about your background:

1. Please state your country:

2. What is the name of your department/organisation?

3. What is the function of your department/organisation?

- ☐ Labour inspectorate
- ☐ Revenue administration/tax
- ☐ Social security department
- ☐ Employer's organisation
- ☐ Employee's organisation
- ☐ Third sector organisation (e.g. NGO's)
- ☐ Local government
- ☐ Social intelligence/inspection
- ☐ Customs
- ☐ Immigration office
- ☐ Research organisation

Other (please specify)

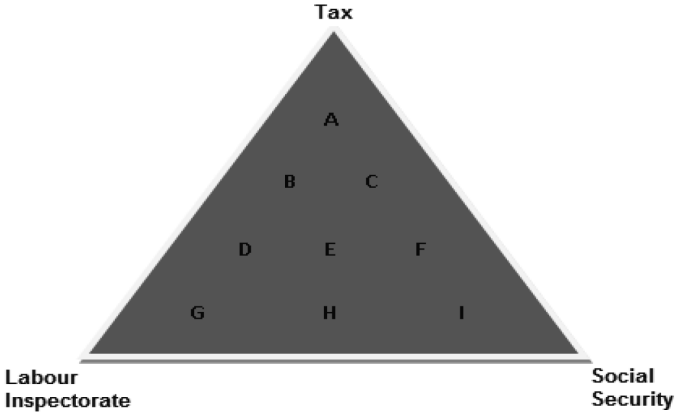
Characteristics of Existing National Policies

4. What are the three most dominant policy 'themes' used in your country to tackle undeclared work? Please list 1st, 2nd and 3rd in order

Deterrence: Penalties	
Deterrence: Measures to improve detection	
Enabling: Preventative measures	
Enabling: Curative measures	
Enabling: Fostering commitment to declared work	

5. Can you please list some examples of policies (good practice)?
Try to identify at least 3 policy measures, stating:
- Objectives
- Results
- If transferable
- Information (evaluations, contacts)
- Bibliography

1.
2.
3.
4.
5.



6. Please choose which point on the image best signifies where the responsibility lies for tackling undeclared work in your country:

- ☐ A
- ☐ B
- ☐ C
- ☐ D
- ☐ E
- ☐ F
- ☐ G
- ☐ H
- ☐ I

7. Please choose which of the following statements best denotes the trajectory of change in terms of where the responsibility lies for tackling UDW:

- ☐ Fairly constant
- ☐ Shifting towards tax
- ☐ Shifting towards labour inspectorate
- ☐ Shifting towards social security
- ☐ Shift towards tax and social security
- ☐ Shifting towards tax and labour inspectorate
- ☐ Shifting towards social security and labour inspectorate

8. How did policy towards UDW develop in the last 10 years?
- Any shift of emphasis in policy?
- Involvement of social partners?
- Influence of EU?

Policy Measures

These questions relate to the national polices with regard to tackling undeclared work in your country.
Although no official definition of undeclared work (UDW) exists, there is a broad consensus on what is included and excluded. In this project, this consensus is reflected by using the following definition of undeclared work as a starting point:
'any paid activities that are lawful as regards their nature but not declared to the public authorities, taking into account the differences in the regulatory system of Member States' (European Commission, 2007: 2)

9. Please tick the policy measures that are used in your country

- ☐ Use of penalties and fines for purchasers/companies
- ☐ Use of penalties and fines for suppliers/employees
- ☐ Measures to improve detection
- ☐ Data matching and sharing
- ☐ Workplace inspections
- ☐ Registration of workers prior to starting work or on first day/week of work
- ☐ Coordinating strategy across government
- ☐ Coordination of operations across government
- ☐ Coordination of data sharing across government
- ☐ Use of peer-to-peer surveillance (e.g. telephone hotlines)
- ☐ Certification of business, certifying payments of social contribution and taxes
- ☐ Mandatory ID on the workplace
- ☐ Reduce the regulations

- ☐ Simplify procedures for complying to existing regulations (e.g., easier registration procedures; simplify forms; reduce duplication)
- ☐ Technological innovations to prevent undeclared transactions (e.g. certified cash registers)
- ☐ Introducing new categories of work e.g., simplify procedures for small or mini-jobs
- ☐ Use of direct tax incentives (e.g., exemptions, tax deductions)
- ☐ Use of social security incentives
- ☐ Initiatives to ease transition from unemployment into self-employment
- ☐ Initiatives to ease transition from employment into self-employment
- ☐ Changing minimum wage upwards
- ☐ Changing minimum wage downwards
- ☐ Training & support to business start-ups
- ☐ Micro-finance to business start-ups
- ☐ Advice on how to formalise
- ☐ Connecting pension schemes to formal labour
- ☐ Introducing supply chain responsibility
- ☐ Restriction on free movement of (foreign) workers
- ☐ Measures to encourage purchasers to buy formal goods and services:
- ☐ service vouchers
- ☐ targeted direct tax incentives (e.g., income tax relief/reduction/subsidy schemes)
- ☐ targeted indirect taxes (e.g., VAT reductions)
- ☐ Measures to stimulate suppliers to formalise:
- ☐ society-wide amnesties
- ☐ individual-level amnesties for voluntarily disclosing undeclared activity
- ☐ ‘formalisation’ advice to business
- ☐ ‘formalisation’ support services to businesses
- ☐ Targeted VAT reductions
- ☐ Provide free record-keeping software to businesses
- ☐ provide fact sheets on record-keeping requirements
- ☐ provide free advice/training on record-keeping
- ☐ Gradual formalisation schemes (e.g. wage alignments in Italy)
- ☐ Campaigns to inform undeclared workers of the risks and costs of working undeclared
- ☐ Campaigns to inform undeclared workers of the benefits of formalising their work
- ☐ Campaigns to inform users of undeclared work of the risks and costs
- ☐ Campaigns to inform users of undeclared work of the benefits of declared work
- ☐ Use of normative appeals to people to declare their activities
- ☐ Measures to change perceived fairness of the system

- ☐ Measures to improve procedural justice of the system (i.e., degree to which people believe government has treated them in a respectful, impartial and responsible manner)
- ☐ Measures to improve tax/social security/labour inspectorate knowledge
- ☐ Adoption of commitment rather than compliance approach (e.g., 'responsive regulation')
- ☐ Campaigns to encourage a culture of commitment to declaration

10. Are any of the above policy measures in your opinion particularly effective in tackling undeclared work?

Cross Border Cooperation

The next questions relate to characteristics of existing cross-border co-operations on undeclared work

16. To your knowledge, does your country participate in any cross-border co-operation in relation to tackling undeclared work?

- ☐ Yes
- ☐ No

17. Please state with which countries:

18. Is this cooperation in the realm of:

- ☐ Strategy
- ☐ Operations
- ☐ Data-matching
- ☐ Don't know

Other (please specify)

Nature and Extent

19. Do you know of any estimates of the extent of UDW in your country?

Percentage of GDP?	
Percentage of the labour force?	
Years of measurement?	
Authors?	

Development in extent (growing, getting smaller)? (last 10 years)

20. What is the nature of UDW in your country?

Percentage of envelope wages

Percentage of waged informal employment

Percentage of informal self-employment

Percentage of paid favours between friends, neighbours and acquaintances

21.In what sectors do you think undeclared work is concentrated in your country?

22. Are there differences in participation between regions? If so, please state the differences and name the regions

23. What do you think the distribution of UDW is between rural and urban areas? (please state in percentages)

Rural

Urban

24. Do you think there are differences in demographic factors of participants? (e.g. more women than men)

Sex

Education

Occupation

Other (please state)

Concluding

25. In November we will organize a workshop with experts from the five countries in the study. The main goal of this international workshop will be to validate our findings. Would you be interested to participate in the meeting?

☐ Yes ☐ No

26. Could you please provide us with your details so that we can contact you for future reference

Name	
Professional Status	
Email	
Phone Number	
Skype Name	

27. To conclude, could you please provide us with contact details of the persons or departments/agencies you think should also be interviewed. For example, of the organisations that you mentioned earlier within your national institutional framework, or involved in cross-border co-operation.

Name	
Email	
Phone Number	

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STATE FUNDING FOR HEALTH-CARE SERVICES AND PUBLIC HEALTH: IS IT BASED ON THE PRINCIPLES OF ECONOMIC THEORY?

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Abstract
This paper is based on the classification of healthcare services and public health actions in light of some fundamental principles of public economics. Specifically, public health actions can be regarded as a public good while healthcare services seem to be a private good. This difference should have a direct impact on their optimum provision by the state, and therefore this classification has to affect the rationale of a resource allocation which is based on economic theory. However, the data do not confirm a situation in which a public good (public health) is largely financed by the state. On the contrary, healthcare services, which have the properties and the characteristics of a private good, are funded by the state with a high percentage of health expenditure. Thus, this paper describes the paradox observed in the health sector, which highlights a mismatch between economic theory and the policies for optimum resource allocation in this sector.

JEL Classification: I18
Keywords: Public Health, Public Goods, Private Goods, Resource Allocation

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Acknowledgements: Ilias-Ioannis Kyriopoulos gratefully acknowledges and thanks the Alexander S. Onassis Public Benefit Foundation for supporting his studies at the LSE.

Introduction

Given the high and increasing level of health expenditure as a percentage of GDP in most of the developed countries (Jones, 2003), the search for the efficient distribution and the rational management of the resources allocated to this sector is an integral part of public financial management and a key determinant of fiscal sizes. At the same time, it is widely acknowledged and corroborated that health expenditure has a significant influence on the government budget. For this reason, health economics is an important scientific field, whose applications are related to the use of methodological tools for optimal resource allocation in the healthcare sector, in light of scarcity, opportunity cost (Sendi *et al*., 2002) and the alternative uses of resources.

In general, government interventions in the healthcare sector follow two basic directions. The first is related to the planning, the construction and the operation of the infrastructure of healthcare services, while the second direction is based on public health and prevention activities. The difference between these is obvious and substantial, not only in the targets and the results in clinical and epidemiological terms, but also regarding their classification as public or private goods, as the latter are defined by economic theory.

Based on the above, this paper attempts to investigate the degree of rationality of the division of health expenditure between the directions referred above. This procedure is based on the basic principles of economic theory. Consequently, it aims to find the existence of a correlation between the given resource allocation in this sector and a theoretically more rational resource allocation from government funding in Greece.

Theoretical Background

The theoretical basis of this paper is divided into two sections. The first aims to define clearly the content and the purpose of healthcare services and public health activities. In this way, it is possible to highlight some of their properties and characteristics, which are useful in order to take rational choices and decisions and to formulate effective policies. The second section is related to the classification of healthcare services and public health activities as public or private goods. As stated previously, this classification is based on the fundamental principles of economic theory.

Firstly, it is important to note that according to the World Health Organization, healthcare services provision is the most "visible" function of a healthcare system, associated with the diagnosis, the management and the treatment of a disease. Healthcare services provision requires a range of inputs, including skilled human resources, biomedical and pharmaceutical technology, fixed capital, etc. Furthermore, the provision of healthcare services is applied to individuals or groups of individuals who suffer from the same diseases.

On the other hand, public health can be defined as a political and administrative project for the management and control of the major risk factors for health (Atwood

et al., 1997), based on the use of scientific data and empirical evidence. Public health is mainly related to disease prevention, the control of infectious and communicable diseases, health promotion and the adequate education of individuals in issues that affect their daily hygiene. Therefore, it is less related to individual therapeutic interventions (Verweij *et al*., 2007). Specifically, public health can be defined as the science of preventing disease, prolonging life and promoting health through the organized efforts of a society (Acheson, 1988). In addition, it is important to remark that the establishment, operation and improvement of the institutions and actions that constitute public health are mainly related to the formation and the improvement of the level of health indicators (such as mortality rate, morbidity rate etc.) for the entire population.

According to historical experience, water quality control, the operation of sewage systems and the treatment of infectious diseases are major determinants of mortality reduction (Bahr, 1993; Susser *et al*., 1996). In addition, improved nutrition, especially since the 18th century, seems to be an important factor in reducing mortality, while hygiene has also played an important role since the mid-19th century, reducing the mortality due to diseases carried by food or water. Thus, 20% of avoided cases of mortality, from the mid-19th century until the late 20th century, seem to come from hygiene measures and actions (McKeown, 1976). Generally, it is widely accepted that public health actions have been among the most important factors in the increase in life expectancy since the late 19th century (Cutler *et al*., 2005).

In order to categorize the healthcare services and public health actions, as referred to previously, it is necessary to mention some fundamental theoretical elements of public economics. Thus, according to Table 1, a good is public if the consumption of it by an extra person costs little or nothing and if it is difficult or impossible to exclude this person from the consumption of it. Therefore, a good is considered as public if it presents the characteristics of non-excludability and non-rivalry.

Table 1. Public, private and common goods

	Excludable	Non-excludable
Competing	Private Goods (food, clothes, cars)	Common Goods (fish stocks)
Non-competing	Club Goods (satellite television)	Public Goods (free-to-air television, national defence)

Public health policies have both the characteristics of non-excludability and non-rivalry, because it is impossible to exclude an additional person from the consumption of them, and at the same time there is an almost zero marginal cost coming from the additional consumption. In contrast, the exclusion is potentially feasible in goods that are related to healthcare services (for example in medical treatment), while the additional consumption by one more person leads to additional costs. Therefore, according to this classification, public health actions can be considered as a public good, while healthcare services seem to be private goods (Rosen, 1995).

Furthermore, it is important to clarify that solidarity externalities are observed in national health systems with specific characteristics, like the Beveridge-type or Bismarck-type healthcare system (in which social insurance plays a dominant role). In these cases, healthcare services are treated largely as a quasi-public good, despite the fact that they are not free goods.

Thus, the treatment of infectious diseases, protection from environmental hazards affecting health or policies against smoking and alcohol have the core characteristics of a public good (McNeal, 1976; McMichael *et al*., 1997), since they are actions related to public health and prevention. Moreover, public health actions, such as vaccination against an infectious disease, create externalities. To prove this, it is useful to mention an example of a vaccination. In this case, the more people vaccinated against a disease, the lower the probability of the appearance of a widespread epidemic. Therefore, the marginal benefit function ignores some important social benefits, which should be included.

In addition to the previous elements mentioned, it is important to mention the relationship between public health actions and healthcare services in terms of substitution and complementarity. Specifically, public health is a substitute for health care services in the case of vaccination, by which public health removes the need for diagnostic and therapeutic medical services for infectious diseases. On the other hand there are cases in which public health actions are complementary goods for health care services, such as in population screening tests.

Material and Methods

The methodology of this paper is based on the classification of healthcare services and public health actions into public or private goods. It is important to highlight that this classification is based on some specific characteristics that these public and private goods have, as defined by the principles of public economics.

As stated previously, public health actions are non-excludable and non-competing goods, whose consumption mainly benefits society as a whole. Therefore, they can be classified as public goods. In contrast, healthcare services primarily benefit the people who consume them. Despite this, healthcare services are often considered public goods, mainly because the government intervenes through social security programs for social and political reasons. Therefore, although healthcare services are theoretically private goods, the state intervention confers on them the status of a quasi-public good.

In this context, the funding of public health actions should be a priority of a national strategy for the health sector, combined with the efforts for effective control and management of the major health problems and hazards, which are also integral parts of public health.

Therefore, the allocation of expenditure on public health actions and healthcare services is an important point for health economics and policy. Despite the existence of a data base for these expenditures from the Organization of Economic Cooperation and Development (OECD), the data seem to be incomplete in the case of Greece. Thus, this paper attempts to estimate the expenditure on public health actions, through the synthesis of data from the state budget, the budgets of social insurance funds and the expenditure of households, combined with data elicited from expert assessments, i.e. personal interviews/communications with the CEOs and Presidents of the major social insurance funds in Greece.

Particularly, expenditure on public health can be expressed as:

$TPHE = PHE_S + PHE_P$ or
$TPHE = PHE_g + PHE_i + PHE_P$

Where,

TPHE, the total expenditure on public health
PHE_S, the expenditure on public health by the government
PHE_P, the expenditure on public health by households
PHE_g, the expenditure on public health in the state budget
PHE_i, the expenditure on public health by the social insurance funds

The expenditure for public health actions and preventive measures in the state budget amounted to 57.527 thousand Euros in 2009, while the costs and wages for the people employed in public health (doctors and dentists for public health, public health supervisors, administrative staff and operational expenses) are estimated at 26.065 thousand Euros. Consequently, by adding the previous amounts, the expenditure on public health in the state budget was approximately 83.592 thousand Euros in 2009.

The expenditure of the social insurance funds (IKA, OPAD, OAEE, OGA and others), calculated either from data of their budgets or from estimates of their management. Thus, the expenditure of IKA on public health is 22.611 thousand Euros, while the expenditure of OPAD is estimated at 6.000 thousand Euros and the corresponding costs of OAEE are estimated at 7.211 thousand Euros. Regarding the other social insurance funds which have similar arrangements and procedures with OPAD, the expenditure (based on per capita expenditure of OPAD) approximates the amount of 8.500 thousand Euros.

Finally, an indirect estimate was used to calculate the expenditure of OGA on public health actions, based on the activity of the staff of health centers in rural areas and the distribution of working time in public health actions combined with the operating costs. The estimated amount was approximately 15.000 thousand Euros. Therefore, the public expenditure on public health actions (including government and social insurance funds) was about 143,600 thousand Euros in 2009.

Furthermore, the consumption of public health services by suppliers of the private sector (doctors and diagnostic centers), combined with the consumption and the cost of primary care, were used to assess the expenditure of households for public health actions. This expenditure is estimated at 175,000 thousand Euros.

It is important to stress that these estimates are based on the consumption and use of public health actions, and they do not include diagnostic tests, physician visits and counseling services, which are parts of clinical care and healthcare services. In addition, these estimates do not include the expenditure of state and regional and local government for public health actions related to the quality of water or environmental issues.

Undoubtedly, the data base and statistical series for the health sector in Greece have been improved since the mid-1990s, based on the OECD and EU standards. However, the primary production of data and indicators has significant problems, and as a result, the interstate comparisons are limited and indicative only.

The aforementioned reflect the questioning about the degree of accuracy of the figures for distribution of health expenditure, especially by the government. This issue becomes more important in the case of Greece, where the major risk factors associated with public health (such as smoking, alcohol abuse, high body-mass index in a large proportion of the population, low participation in physical activity, malnutrition) are high in frequency, endangering the health status of the population (Institute for Social and Preventive Medicine, 2006, 2008; National School of Public Health, 2006, 2011).

Results

The distinction between the expenditure on healthcare services and public health in Greece is not clear, mainly because of the absence of data about the expenditure on public health. However, given the necessity of some indicative data for this issue, an estimate of expenditure on public health was attempted, which is summarized in Table 2.

This estimate was based on (a) the expenditure in the state budget (b) the expenditure of the social insurance funds and (c) the expenditure of households. In summary, the three units mentioned previously constitute the total expenditure on public health. It is worth mentioning that the total expenditure includes the prevention and public health actions of the Ministry of Health and Social Solidarity, the salaries of research and administrative staff involved in public health, the activities of social insurance funds as well as household expenditure, which is a part of the expenditure on primary health care.

Table 2. Expenditure on Public Health in Greece

Type of Expenditure	In million Euros	Percentage
Total Health Expenditure	22.891	100,0
Public	13.949	60,7
Private	9.032	39,3
Total Expenditure on Public Health	318,6	100,0
Public	143,6	45,1
Government	83,6	26,2
Social Insurance Funds	60,0	18,9
Private	175,0	54,9

Source: National Statistical Service of Greece, OECD Health Data 2011 and own estimations.

According to the previous assessment, the expenditure on public health as a percentage of total health expenditure is estimated at 1.5%. Moreover, the average expenditure for OECD countries is estimated at 3.1% of total health expenditure and 2.9% for EU countries in 2008[13]. Moreover, the public expenditure on public health is estimated at 1.1% of public expenditure on health, while the total expenditure on public health is approximately 45% from public spending and 55% from private spending. Regarding public expenditure on public health in other countries, this was 82.7 % of total expenditure on public health in OECD countries, and 77.1% in EU countries in 2008.

Discussion and Conclusions

In the theoretical background of this paper there is a reference to the necessity for a classification of healthcare services and public health actions, based on the difference between public and private goods. The purpose of this classification is to examine more effectively the size and the structure of health expenditure and to recommend a different way of thinking on the effective allocation of scarce resources in the alternative objectives of health policy.

Based on the aforementioned, some specific characteristics can be inferred, which are worth analyzing. First of all, public health actions retain the characteristics of a public good, while the provision of healthcare services is regarded as a private good, which, under the umbrella of social insurance is acknowledged as a “merit good”.

Table 3. Expenditure on Health and Public Health in Greece, European Union and OECD

	OECD (31)	EU (27)	Greece
Total Health Expenditure (% of GDP)	9,0	8,4	9,7
Public Expenditure (% Total Health Expenditure)	72,8	73,5	60,3
Private Expenditure (% Total Health Expenditure)	27,2	26,5	39,7
Expenditure on Public Health (% Total Health Expenditure)	3,1	2,9*	1,4
Public Expenditure on Public Health (% Expenditure on Public Health)	82,8	77,1*	45,1
Private Expenditure on Public Health (% Expenditure on Public Health)	17,1	22,9*	54,9

Source: OECD Health Data 2010 and own estimations
*Data for the EU-19 countries

Secondly, according to OECD data, expenditure on public health is internationally a small percentage of total health expenditure. Thirdly, the expenditure on public health in Greece (estimated in this paper) is an even smaller percentage of total health expenditure compared to other countries. Finally, the composition of expenditure on public health in Greece has large differences compared with other developed countries.

However, the scientific debate surrounding the issue of state funding in the health sector can be related to the absence of policies and actions for prevention and public health. Moreover, these actions have proven to have an important role in the elimination of some major diseases which affected humanity for many years, and as a result, they contributed to the increase of life expectancy and improved some important epidemiological indicators. Despite the significance of these, there is a lack of data, which is something that reveals serious distortions in methodology used to set priorities and to structure health expenditure rationally. Therefore, the funding policies for public health actions are not based on evidence, data and measurements, which seem to be necessary for effective policy plans.

Furthermore, given the contribution of public health in improving health, the problem that arises is related to both the low public expenditure on public health as a percentage of the total expenditure on public health as well as the low total expenditure on public health as a percentage of total health expenditure. In short, although it seems

that there is no evidence to prove that healthcare services have greater contribution or effectiveness in improving health, the funding is very unequal, to the detriment of public health actions.

Although the issues of public health and prevention have special significance in Greece, owing to reasons analyzed previously, the expenditure on public health is very low, even compared with the corresponding low expenditure of the other OECD and EU countries.

The above seem to be important, since the risk factors associated with lifestyle, the burden of the environmental problems and the absence of well-organized screening programs requires changes in the policies implemented. In this way, public health actions can be an integral part of new policy planning.

Furthermore, according to the estimate made for the expenditure on public health in Greece, an important paradox is observed, which does not occur in the other developed countries. Specifically, this paradox is related to the fact that the expenditure on a public good, such as public health actions, is equally divided between the public and the private sector. However, according to the principles of public economics and experience so far, public goods are mainly provided by the state, owing to market failures. As a result, the consumers have to bear the burden of paying for public health actions, while these should be provided by the state, like other public goods.

The issue of the state funding of healthcare services and public health has a leading political and social role. Particularly, a private good, such as healthcare services, is funded by the state, while a public good, which can be regarded as its substitute, is underfunded. Although there are examples of private goods provided by the state, in the name of social policy and solidarity, it is a paradox that a public good, whose significance is widely accepted, has very few available state resources committed to it.

Regarding some market failures, it is noteworthy that the nature of externalities seems to be different, when compared with externalities such as air pollution. Specifically, a massive vaccination or a pandemic can be regarded as positive and negative externality respectively, as the action of an agent directly affects the other agents (e.g. the reduction of the possibility of a transmission of a contagious disease, in case of a vaccination). A classical way to face the externalities was expressed by Ronald Coase (establishment of property rights), while Pigovian taxation is also a policy measure to reduce the impact of negative externalities. However, these approaches cannot be the responses to such externalities. For example, in the case of a pandemic, the sufferers did not cause their disease, and thus it is unfair and unreasonable to impose a form of "punishment" or "conformity" on them. Thus, an effective solution could be a prevention strategy, in order to mitigate the negative effects. However, actions such as a prevention strategy require systematic funding of public health actions.

In many countries, including Greece, the state provides both health insurance and healthcare services. In Greece, and generally in the EU, healthcare services are funded

by the state, regardless of the ability to pay (Mossialos and Thomson, 2002). Thus, the state insurance funds do not select insurance packages for individuals or groups with specific characteristics (e.g. the elderly or people with chronic diseases); they just insure the population. The vast majority of people living in Greece are insured, and therefore there are no phenomena of adverse selection or "cream-skimming", as the government intervenes in response to such market failures. Theoretically, the state guarantees equal access to all, regardless of the heterogeneity of risk types or individual characteristics.

In light of the above, one can claim that financing health care services is a manifestation of belief in equity. This is a true opinion; however the purpose of this paper is to examine the opinion that by supporting public health actions, a national health system can reduce the need for healthcare services. This does not do away with the fact that a national health insurance system should be a main priority of every state. However, this requires a specific plan in order to combine equity and efficiency. The recent example of the Greek national insurance fund highlights a model which does not promote a targeted and structured national insurance policy. Specifically, the almost full insurance coverage provided by the government leads to phenomena which are related to moral hazard, as there is a trade-off between risk reduction and the deadweight loss from moral hazard (Manning and Marquis, 1996). In light of the above, a response to this fact is a change in the rationale and the size of the insurance coverage and the relocation of resources to public health actions.

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EVALUATION OF THE IMPACT OF BUSINESS ON THE ENVIROMENT USING GREEN ACCOUNTING INDEXES AND MODERN STATISTICAL METHODS

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Abstract
To date, accounting and financial sciences have attempted to assess companies using financial ratios and other techniques that evaluate only the front office, without considering its impact on the environment. Recently, this assessment has been expanded to include new concepts, known as corporate social responsibility and social balance. These new concepts are usually viewed and studied using a multidisciplinary perspective with an aim to update the current and future value of the company. In this evolving scientific field a considerable effort has been made to objectively record and calculate the environmental impact of a company's activities by integrating these elements into a new form of economic balance sheet. The present paper seeks to examine the presence of weighted environmental indexes and explores the process by which they can be used to evaluate a company.

JEL Classification: Q5-Environmental Economics, Q51-Valuation of Environmental Effects
Keywords: Econophysics, Enviromental Indexes, Neural Networks

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Introduction

Until the last half of the 20th century, an organization's main goal was to ensure its profit and financial state without considering the impact of its relevant applications and/or productions on the environment. In fact, the single concern was how to find available and cheap natural resources, to extract them and use them efficiently. Few measures were taken to ensure that a company was environmentally friendly, not even measuring the footprint of the process done.

It was only in the middle of the 20th century that it became evident that the extreme consumption of environmental resources leads to irreversible environmental disruption. The reason for this disruption is the accumulation of environmental misuse from previous generations, as well as current neglect. Organizations started to realize that it is for their benefit to protect the environment, and at least be sure that the rate of environmental consumption is smaller or even equal to the rate at which the environment restores itself.

The new term born was "sustainable development" and the first to talk about it was the Prime Minister of Norway, Gro Harlem Brundtland (Brundtland Report, 1987). The main issue now is how to satisfy present needs without risking or undermining future generations' capability of satisfying their needs. The solution to this problem demands a new way of thinking, innovative choices and use of brand new technology.

Financial Ratios

Financial statement analysis is important to boards, managers, payers, lenders, and others who make judgments about the financial health of organizations. One widely accepted method of assessing financial statements is ratio analysis, which uses data from the balance sheet and income statement to produce values that easily interpret the financial situation (Garrison, Ray, Noreen, & Brewer, 2009).

In fact, most organizations routinely evaluate their financial condition by calculating various ratios and comparing the results to those for previous periods, looking for differences that could indicate a meaningful change in financial condition. Another usage is to compare their current ratios with those known as "market leaders", in order to examine if they are on the right developmental path.

There are different financial indicators measuring different dimensions of financial performance, such as profitability and liquidity, and all of this information is needed to make an informed judgment about the financial health of an organization (Adamidis, 1998).

To select financial performance dimensions, five top-selling textbooks on financial management were reviewed (Garrison, Ray, Noreen, Brewer, 2009; Horngren, & Olivar, 2009; Kaplan, Atkinson, Young, 2003; Venieris, 2007; Adamidis, 1998). Not surprisingly, there was substantial overlap and it was relatively straightforward to establish four preliminary dimensions of financial performance: liquidity, capital structure, activity and profitability.

In our case we selected to examine:

Liquidity with

a) Current ratio = $\frac{CurrentAssets}{CurrentLiabilities}$,

b) Quick ratio = $\frac{CurrentAssets - Inventory}{CurrentLiabilities}$

Capital Structure with

a) Total Debt / Total Assets = $\frac{TotalLiabilities}{TotalAssets}$

b) Equity Financing = $\frac{FundBalance}{TotalAssets}$

c) Cash Flow to Total Debt = $\frac{NetIncome + DepritiationExpences}{TotalLiabilities}$

Activity with

a) Total Asset Turnover = $\frac{TotalOperating\,\mathrm{Re}\,venue}{TotalAssets}$

b) Fixed Asset Turnover = $\frac{TotalOperationg\,\mathrm{Re}\,venue}{NetFixedAssets}$

c) Current Asset Turnover = $\frac{TotalOperating\,\mathrm{Re}\,venue}{CurrentAssets}$

and Profitability with

a) Operating Margin = $\frac{TotalOperating\,\mathrm{Re}\,venue - OperatingExpences}{TotalOperating\,\mathrm{Re}\,venue}$

b) Return on Assets = $\frac{NetIncome}{TotalAssets}$

Environmental Performance Indicators - EPI (Sustainability Indicators, Green Indexes)

Environmental Performance Indicators (EPI) have the potential to turn the generic concept of sustainability into action. Though there are disagreements among those from different disciplines, these disciplines and international organizations have each offered measures or indicators of how to measure the concept.

Various ways of operationalizing or measuring sustainability have been developed. During the last 10 years there has been an expansion of interest in EPI systems, both in industrialized and, albeit to a lesser extent, in developing countries. EPIs are seen as useful in a wide range of actors: international and intergovernmental bodies; national governments and government departments; economic sectors; administrators of geographic or ecological regions; communities; nongovernmental organizations; and the private sector.

EPI processes are supported and driven by the increasing need for improved quality and regularly produced information with better spatial and temporal resolution.

At the heart of the debate over different indicators are not only different disciplinary approaches but also different views of development. Some indicators reflect the ideology of globalization and urbanization that seek to define and measure progress on whether different countries or cultures agree to accept industrial technologies in their eco-systems. Other approaches, like those that start from international treaties on cultural rights of indigenous peoples to maintain traditional cultures, measure the ability of those cultures to maintain their traditions within their eco-systems at whatever level of productivity they choose.

Currently, the main agencies around the world dealing with EPIs are United Nations Environmental Protection Agency (UN EPA), European Environment Agency (EEA), Environmental Permitting Regulations (EPR), Eco Management and Audit Scheme (EMAS) and other organizations.

Although no global standard is yet in force, as mentioned previously, there are standards brought up by individual organizations and companies that are able to collect, classify, analyze and report EPIs. The main two differences amongst them are the extension of information handled and the area of main interest given. For example, standard IPIECA (International Petroleum Industry Environmental Conservation Association) is greatly interested in the consequences of oil and pays less attention to other forms of energy consumption, e.g. electricity or gas.

Standards that are key players at the moment globally are:

a) AccountAbility, with three standards in action
   AA1000APS (2008) AcountAbility Principles Standard
   AA1000AS (2008) Assurance Standard and
   AA1000SES (2005) Stakeholder Engagement Standard

b) IPIECA (International Petroleum Industry Environmental Conservation Association)
c) DEFRA (Department for Environment, Food and Rural Affairs – Gov. Depart. in UK)
d) FTSE4GOOD (Financial Times and the London Stock Exchange)
e) Deloitte and Touche Tohmatsu
f) ISO26000 (International Organization for Standardization)
g) ACCA (Association of Chartered Certified Accountants) and finally
h) GRI (Global Reporting Initiative)

From the above extended list, we chose to use in our research the GRI standard, since most organizations in Greece submit reports using it. From the list of all the EPI the standard has, we picked up two, the first dealing with energy and the second with water management:

a) Aspect Energy
   EN3 Direct energy consumption by primary energy source
b) Aspect Water
   EN8 Total water withdrawal by source

The current proposal

Currently, an organization's characteristics are defined by its financial statements and/or other financial data, expressed in global standards forms. Regarding the environmental behavior, we have a blurred picture since at the moment there are no obligatory regulations an organization has to follow. Still, some do keep up with some environmental standards, like GRI for instance.

We all sense that financial and environmental results have a strong interconnection, since if we had no action we would have neither financial transactions, nor environmental footprint. So, is it possible to find a model that connects them? We also sense that such a model, if it exists, will not be something simple and linear, but instead non-linear, with parameters that are hard to define. Having all these in mind we decided to search a possible connection by using neural networks.

Proposed Method

An Artificial Neural Network (ANN) is a system based on the operation of biological neural networks, in other words, is an emulation of a biological neural system. Artificial Neural Networks have different architectures, which consequently lead to different types of algorithms and problem solving, and are among the newest technologies in the financial statistics toolbox. The field is highly interdisciplinary, but our approach will restrict the view to the financing perspective, in which ANN serve two important functions: a) pattern classifiers and b) nonlinear adaptive filters.

An ANN is an adaptive, nonlinear system that learns to perform a function (an input/output map) from data. Adaptive means that the system parameters are changed during operation, normally called the training phase. After the training phase the ANN parameters are fixed and the system is deployed to solve the problem at hand (the testing phase). The ANN is built with a systematic step-by-step procedure to follow some implicit internal constraint, which is commonly referred to as the learning rule. The input/output training data are fundamental in neural network technology, because they convey the necessary information to "discover" the optimal operating point. The nonlinear nature of the neural network processing elements provides the system with lots of flexibility to achieve practically any input/output function.

The performance of an ANN hinges heavily on the data. If data do not cover a significant portion of the operating conditions or if they are noisy, then ANN technology is probably not the right solution. On the other hand, if there is plenty of data and the problem is too poorly understood to derive an approximate model, then neural network technology is a good choice.

The Biological Model

ANN emerged after the introduction of simplified neurons by McCulloch and Pitts in 1943 (McCulloch & Pitts, 1943). These neurons were presented as models of biological neurons and as conceptual components for circuits that could perform computational tasks. The basic model of the neuron is founded upon the functionality of a biological neuron (figure 1a).

The Mathematical Model

The functional model of the biological neuron has three basic components:

a) Weights,
b) A linear combination and
c) An activation function.

An acceptable range of output is usually between 0 and 1, or -1 and 1 and is calculated as the output of the neuron from the activation function. Mathematically, this process is described in the figure 1b, where the output of the neuron, y_i, would therefore be the outcome of activation function α (.). In our research we chose to use the sigmoid function (figure 2), since it seems to work well enough in our area of interest.

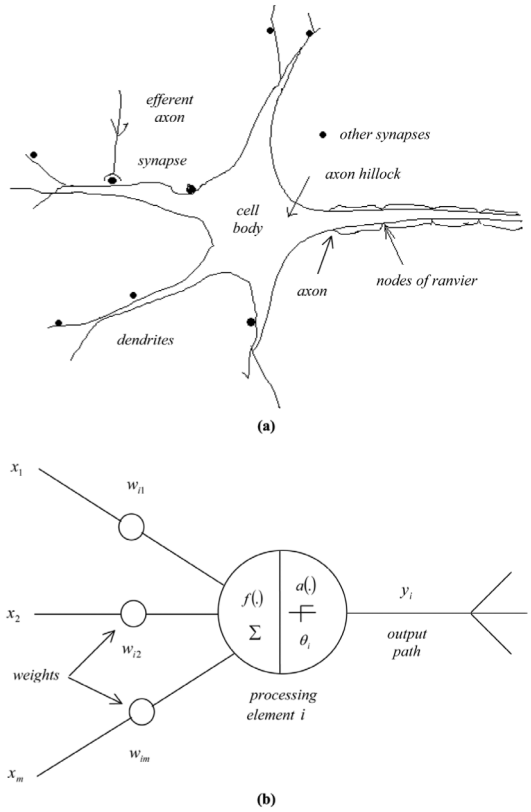

Figure 1. Biological and Mathematical Neuron

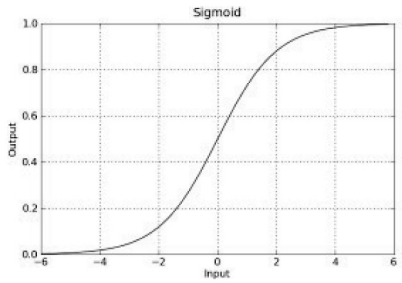

Figure 2. Sigmoid function

Supervised learning results in an adjustment of the weights of the connections between units, according to some modification rule, for example:

$$\Delta w_{jk} = \gamma y_j (d_k - y_k)$$

where γ is a positive constant of proportionality, representing the learning rate, d_k is the desired activation provided by data (Widrow-Hoff rule or Delta rule). Since we are using nonlinear activation functions, we use a generalised delta rule. The error measure E_p is defined as the total quadratic error for pattern p at the output units.

Back-propagation

The application of the generalised delta rule involves two phases: During the first phase the input x is presented and propagated forward through the network to compute the output values y_{po} for each output unit. This output is compared with its desired value d_o, resulting in an error signal δ_{po} for each output unit. The second phase involves a backward pass through the network during which the error signal is passed to each unit in the network and appropriate weight changes are calculated.

Back-propagation can be applied to networks with any number of layers, just as for networks with binary units it has been shown (Hornik, Stinchcombe, & White, 1989; Funahashi, 1989; Cybenko, 1989; Hartman, Keeler, & Kowalski, 1990) that only one layer of hidden units succeeds in approximating any function with finitely many discontinuities to arbitrary precision, provided the activation functions of the hidden units are non-linear (the universal approximation theorem). In most applications a feed-forward network with a single layer of hidden units is used with a sigmoid activation function for the units.

Learning rate and momentum

For practical purposes we chose a learning rate that is as large as possible without leading to oscillation. One way to avoid oscillation at large, is to make the change in weight dependent on the past weight change by adding a momentum term (Diamantaras 2007, Zapranis 2005).

Discussion

To test our model, we chose to use a:

a) Multi Layer Perceptron (MLP) model with one hidden layer and six neurons
b) Sigmoid activation function
c) Back Propagation training algorithm

as seen in figure 3.

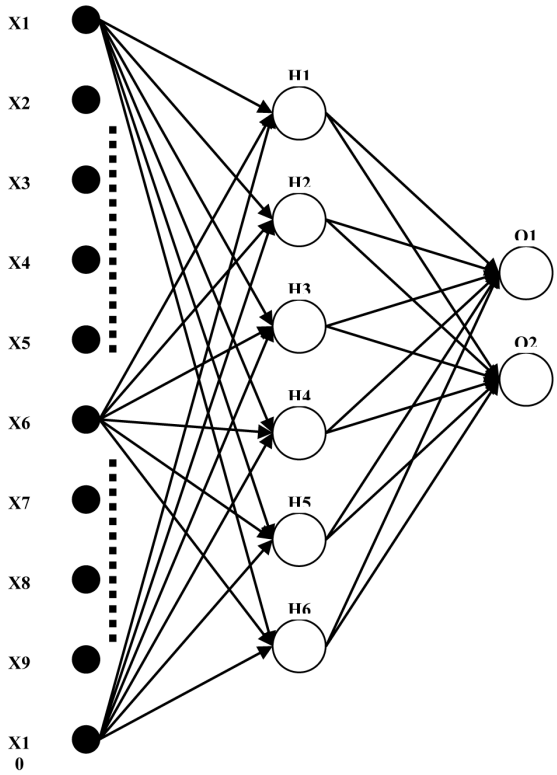

Figure 3. Our test model

If we find a realistic model that verifies our data, then we will be able to act in the reverse scheme, like an if–then–else scenario in a spreadsheet. It will allow us to decide for environmental critical projects and their extension before they are built, explore possible limits of existing ones and in general unify the information we can have for an organization.

If on the other hand the chosen model cannot verify our data, we will evaluate the error vector and decide our next step. If the error seems to be manageable, we will try different number of neurons in the hidden layer and/or more exotic training algorithms.

If finally the error seems to be unmanageable, we will change our direction to use other statistical tools, like for example data envelopment analysis (DEA).

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ASECU South-Eastern Europe Journal of Economics 1 (2013) 59-78 SEEJE

MIGRATION AND THE ECONOMIC AND SOCIAL LANDSCAPE OF GREECE

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Abstract
Over the last decades migration has altered the economic and social landscape of Greece. Key migrant flows triggering this transformation were the massive migrant inflows that commenced with the collapse of socialist regimes in Central and Eastern Europe in the early 1990's, the return flows provoked by the severe economic crisis affecting Greece since 2008, and the outflows of Greek nationals sparked by the same recession. Some of the main economic and social consequences of these flows are examined in this paper.

JEL Classification: J61, J15, J21
Keywords: Migration, Greece, Economic Crisis.

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Over the last decades migration has been a major factor shaping the economic and social landscape of Greece. A traditional migrant-sending country since the end of the nineteenth century, Greece became a migrant-receiving country in the last decades of the twentieth century. However, before the end of the first decade of the twenty-first century, Greece was becoming a migrant-sending country once again. The impact of these inflows and outflows on the economic and social landscape of Greece is multi-faceted.*

This paper aims to examine certain dimensions of the impact of these migration flows. The dimensions focused on are grouped in two sets. The first set, corresponding roughly to the period from 1990 to the onset of the economic crisis in 2008, includes 1) the abrupt change from a relatively homogeneous to a very diverse population of Greece in the decade subsequent to the collapse of socialist and communist countries in Central and Eastern Europe, 2) expansion of informal employment, 3) the substitution of family labour in small family enterprises and the home by migrant wage-labour, and 4) the entry of Greece into the Eurozone in 2001, which according to many observers was facilitated by the migrant presence. The second group contains dimensions that have developed concurrently with the economic crisis Greece has experienced since 2008: 1) continuation of unauthorised inflows of migrants without their being incorporated into wage-work as were previous waves of migrants, 2) expansion of return migration, and 3) the new wave of emigration by Greeks.

1. Transformations from about 1990 to the onset of the economic crisis

1.1 From relative homogeneity to diversity

In the last decades of the twentieth century, Greece was transformed from a traditional migrant-sending country to a migrant-receiving country. The main destinations of Greek emigrants at the end of the nineteenth century were the United States and Australia, while after World War II they became countries of northern Europe and especially Germany (Lianos and Cavounidis 2012). Flows of immigrants into Greece started to accelerate in the mid-1970s, but it was with the collapse of socialist regimes in Central and Eastern Europe at the beginning of the 1990s that migrant inflows took on massive proportions, with Albania topping the list of source countries. The majority of immigrants present in Greece today originate from this geopolitical group of countries, although in recent years countries of Asia and Africa have emerged as the dominant source countries of migration to Greece.

* I would like to thank the participants of the seminar organized by the Center for European Studies, Harvard University, where I was invited to present this paper in September 2012, for their valuable comments on this paper and particularly Yannis Ioannidis, Michael Herzfeld, Eleni Ontoni and Anna Hardman. I am also grateful to my colleague Ioannis Cholezas. In addition, I thank the anonymous referees of this article for their constructive criticism.

Some of the migrants from these ex-socialist regimes were of Greek descent and Greek migration policies embraced them, facilitating their entry and settlement. However, the overwhelming majority of migrants who arrived in the 1990s were not of Greek descent and either entered Greece without the proper documents or overstayed their initial visas, and most of these undocumented migrants were eventually legalised in one of the three programmes for regularisation of unauthorised migrants carried out in 1998, 2001 and 2005.

Table 1. Foreign Population of Greece in 1981, 1991 and 2001: Main Countries of Nationality

Citizenship	**1981**	**1981**	**1991**	**1991**	**2001**	**2001**
Total	9.739.589	100.00*	10.259.900	100.00*	10934097	100.00*
Greek citizenship	9.558.994	98.15*	10.092.624	98.37*	10171906	93.03*
Foreign citizenship	176.119	1.81*	166.031	1.62*	761.383	6.97*
Without citizenship or of unknown citizenship	4.476	0.05*	1.245	0.01*	430	0.00*
Country of citizenship of foreign nationals:						
"Developed" countries	115.431	65.54**	76275	45.94**	99901	13.12**
EU (15)	59.488	*51.54*	35304	*46.28*	46869	*46.92*
Cyprus	19.337	*16.75*	14651	*19.21*	17426	*17.44*
Australia	7.041	*6.10*	6313	*8.28*	8767	*8.78*
USA	23.659	*20.50*	13927	*18.26*	18140	*18.16*
Canada	4.136	*3.58*	4717	*6.18*	6049	*6.05*
Other "developed" countries	1.770	*1.53*	1363	*1.79*	2650	*2.65*
Balkan countries	5.821	3.31**	26226	15.80**	500226	65.70**
Albania	3.563	*61.21*		*78.38*	438036	*87.57*
Bulgaria	807	*13.86*	2413	*9.20*	35104	*7.02*
Romania	606	*10.41*	1923	*7.33*	21994	*4.40*
Yugoslavia (Serbia and Montenegro for 2001)	845	*14.52*	1334	*5.09*	3832	*0.77*
FYROM	0	*0.00*	0	*0.00*	747	*0.15*
Croatia	0	*0.00*	0	*0.00*	219	*0.04*
Bosnia-Herzegovina	0	*0.00*	0	*0.00*	294	*0.06*
Other countries of Central and Eastern Europe	3.630	2.06**	25.022	15.07**	85715	11.26**
Poland	522	*14.38*	9624	*38.46*	12831	*14.97*
Hungary	237	*6.63*	291	*1.16*	538	*0.63*
Czechoslavakia (Czech Republic and Slovakia for 2001)	247	*6.80*	738	*2.95*	1009	*1.18*
Russia (USSR and Russian Federation for 2001)	1.515	*41.74*	12918	*51.63*	71337	*83.23*
Other formerly socialist European countries	1.109	*30.55*	1451	*5.80*	-	-
Other countries	51.237	29.09**	38508	23.94**	75541	9.92**
Asia	41.954	*81.88*	27567	*71.59*	56680	*75.03*
Africa	6.671	*13.02*	8726	*22.66*	15607	*20.66*
America	2.195	*4.28*	2022	*5.25*	3138	*4.15*
Oceania	417	*0.81*	193	*0.50*	116	*0.15*

Note: Those who are citizens of Greece and of another country are classified as Greek citizens. Those who have no citizenship or are of unknown citizenship have been excluded for calculations of percentages.

*As percentage of the total population.** As percentage of the population classified as foreign citizens. Within each country group, the share of specific countries or continents as a percentage of the country group appears in italics.

Source: Kotzamanis (2009)

The rapid expansion of the population of migrants can be seen in a comparison of population census data for 1981, 1991 and 2001[1] (Table 1). It should be noted that data in Table 1 are by nationality and therefore do not correspond to migrants per se – for example, most of the migrants of Greek descent from the former Soviet Union have been naturalised and therefore do not appear as foreign nationals. The comparison of census data for 1981, 1991 and 2001 reveals firstly the rapid increase in the population of foreigners as a proportion of the total population. The share of the foreign population increased from under 2% in 1981 and 1991 to 7% in 2001, while most observers believe that the census of 2001 undercounted migrants, placing their actual population share around 10%. Secondly, a dramatic shift is apparent in the countries of citizenship of the foreign population. In 1981, 65% of foreigners in Greece were from so-called "developed countries" (undoubtedly many were spouses of Greek citizens or business executives) while by 2001 only 13% of the foreign population were from such countries. Likewise, in 1981 only 3% of foreigners were from Balkan countries but in 2001 66% were from these countries. Thirdly, the data exhibit the predominance of a specific source country among the foreign population of 2001 – Albania. A full 58% of the foreigners in Greece in 2001 were Albanian nationals. Fourthly, the data reveal the significance of a specific geopolitical group of source countries – collapsed socialist regimes of Central and Eastern Europe. More than three-quarters of migrants present in Greece in 2001 were from this geopolitical group of countries[2]. It should be noted that at the time of collapse of the Soviet Union, EU documents expressed fears that migration pressure from the area would mainly impact Germany and Austria, but finally it was countries of Southern Europe that experienced massive inflows.

In recent years, countries of Asia and Africa have emerged as the dominant sources of migration to Greece. Like the previous inflows from Central and Eastern Europe, inflows from Asia and Africa are almost entirely unauthorised. Arrest data (Ministry of Public Order 2012) indicate that Afghanistan and Pakistan are the main countries of origin. The new diversity of the Greek population evidenced in the census data is visible in the streets of Athens and other cities, in the fields of the countryside, as well as in public schools of Greece. According to data of the Ministry of Education, foreign students have a significant presence in the educational system. As seen in Table 2, in the school year 2010-2011 the shares of foreign students at the elementary school and at the gymnasium (lower secondary school) were 12.4% and 10.8% respectively. Foreign students also accounted for an important share (around 13%) in the vocationally-oriented upper secondary schools TEE, EPAL and EPAS while their share was much smaller (5.4%) in the upper secondary school called the general lyceum, which prepares students for tertiary education[3].

1. The last population census was carried out in March 2011 but unfortunately data by nationality and place of birth were not yet available as of February 2013.
2. See Cavounidis 2002a for a comparison of migrant inflows into Greece with those into other countries of southern Europe that were also transformed in the last decades of the twentieth century from senders to receivers of migrants.
3. See Cavounidis 2011 for a discussion of differences in enrollment and achievement of foreign and native students.

Table 2. Distribution of Foreign and Greek-descent students in public schools, School-year 2010-2011

Level of education	Total students	Number of foreign students and their percent of the student population		Number of Greek-descent students and their percent of the student population	
Pre-primary	132,223	20,432	(15.4%)	1,265	(1.0%)
Primary	601,047	74,685	(12.4%)	5,605	(0.9%)
Gymnasium	321,682	34,626	(10.8%)	3,822	(1.2%)
General Lyceum	224,224	12,060	(5.4%)	1,780	(0.8%)
TEE, EPAL, EPAS[6]	94,699	12,319	(13.0%)	2,385	(2.5%)
TOTAL	1,373,875	154,120	(11.2%)	14,857	(1.1%)

Source: J. Cavounidis (2011) "The Education of Migrant Children: Participation, Performance and Policies," *Greek Economic Outlook*, issue 15, Athens: KEPE www.kepe.gr

Thus, Greece was transformed over the past decades from a country that sent hundreds of thousands of migrants to Germany and other northern European countries after WW II, to a country receiving hundreds of thousands of migrants who have made Greece a newly diverse society.

1.2 Irregular employment and expansion of the informal labour market

Two important features, however, differentiate the postwar experience of Greece as a sending country from its current experience as a receiving country: the prevalence of undocumented migration and the prevalence of irregular employment in the informal sector. The overwhelming majority of Greeks who migrated to countries of Northern Europe in the postwar decades had proper documents and were employed in the formal sector of their economies, with employment being reported to the authorities and subject to state regulations. Indeed, West Germany actively recruited Greek migrants, signing a bilateral agreement with Greece to facilitate flows northward (Lianos and Cavounidis 2012). By contrast, the overwhelming majority of migrants to Greece since the early 1990s have entered the country without proper documents, while irregular employment of migrants in the underground economy has been widespread. Undocumented employment is characteristic not only of undocumented migrants, who by definition have no access to formal sector employment, but is also common among migrants who gained documented status in one of Greece's three regularisation programmes and thereby acquired the legal prerequisites for employment in the formal sector (Cavounidis 2002b, Cavounidis 2003).

According to the "South European model of immigration" proposed by King (2000), the labour demand which propelled peasants from Greece and other countries of Southern Europe to Northern Europe in the post-war decades differed from the labour demand which attracted migrants to Southern Europe in the last decades of the twentieth century. In the former case it was demand for industrial labour in the formal sector that pulled migrants northward, but in the latter case it was demand for flexible labour in the highly seasonal economic sectors characteristic of countries in Southern Europe such as agriculture, fishing, construction, and tourism, along with demand for domestic work and the care of dependent family members. Much of the labour in these sectors has a tradition of informality in countries of Southern Europe. These sectors indeed account for the bulk of employment of migrants in Greece today. Before the economic crisis began, and specifically in the second trimester of 2008, 51% of the foreign men employed Greece were in construction while main sectors of employment of foreign women were services to households, with 45% of women employed there, while 19% were in the tourism-related sector of hotels and food services (Cavounidis 2012c).

The implications of the migrant presence for the extent of the informal economy is an issue that has been widely discussed in Greece even though there are no appropriate data on which to base reliable conclusions. Of course, a large informal economy existed in Greece prior to the onset of heavy immigration inflows at the beginning of the 1990s (according to some, about 30% of the economy), while other factors have been cited (Kanellopoulos, Gregou and Petralias 2009) as contributing to the extent of undeclared labour in Greece such as the relatively high levels of social insurance contributions, labour market rigidities, and poor public administration. A large proportion of migrants is undoubtedly involved in undeclared employment relationships. The difficulties faced by migrants in getting formal sector jobs were highlighted in a study (Cavounidis 2003) of migrants who had participated in Greece's first regularisation programme and as a result had acquired the legal prerequisites for formal employment. Migrants were asked about the most important problem they faced with life in Greece and the problem they cited most frequently was the difficulty of finding a job in the formal sector of the economy, which would afford them the social security stamps they needed to renew their permits. They reported that in contrast, offers for jobs in the underground economy were abundant.

1.3 Substitution of family labour by migrant wage-labour

Another change in the social and economic landscape of Greece prompted by the migrant presence has to do with the longstanding family character of much of its economy. The migrant presence appears to have contributed to the substitution of unpaid family labour in small enterprises and homes by the use of migrant labour. Compared to other countries of the EU, Greece has long presented exceptionally high levels of

self-employment, with small family work units characterising agriculture, manufacturing and commerce. The influx of low-wage migrant labour appears to have enabled proprietors of farms, shops and other small businesses to hire workers and become employers, while previously they had relied only on family labour. A comparison of data on proportions of employers, those employed on their own account (without employees), salaried employees and family workers in 1986 (before massive migrant inflows began) and 2004 (after inflows) suggested that the presence of migrants willing to work for low wages contributed to changes in employment structures, specifically to the substitution of family labour by salaried employment as well as to a shift in the relative weight of the two segments of the self-employed, with an increase in those employing others and a decrease in those without employees (Cavounidis 2006).

The migrant presence appears to have facilitated the substitution of unpaid family labour by migrant wage labour not only in the ubiquitous small family enterprises of Greek urban and rural areas but also in homes. Limited institutional facilities for care of the elderly and of the young result in a heavy load of family care-work, typically shouldered by women. The widespread use of low-wage migrant women's labour in homes for domestic and care services is evidenced in the large numbers of foreign women employed in services to households, as seen previously. The substitution of waged migrant labour for unpaid family labour in family enterprises and in the home appears to have allowed the entry of native women into salaried employment. An analysis utilising regional Labour Force Survey data for the years 1998-2001 (Lianos 2003) came to the conclusion that the migrant presence did not affect the labour force participation rate of native men but did affect the participation rate of native women, and specifically that a 1% increase in the ratio of immigrants to the total population of a region resulted in an increase in the participation rate of women by 2.5%. In sum, the migrant presence seems to have propelled Greek employment structures towards convergence with those characteristic of most EU countries by contributing to an increase in the proportion of the employed population who work for wages and salaries rather than on their own account.

1.4 Entry of Greece into the Eurozone in 2001

The lower wages of immigrants have been cited by many researchers (e.g. Lianos 2004; Cholezas and Tsakloglou 2008) as having constrained production costs, thereby reducing inflationary pressure and contributing to the achievement of goals set as preconditions for Greece's entry into the European Monetary Union (Eurozone). Migrant low-wage labour was also widely reported to have contributed to the competitiveness of Greek products in international markets, allowing the survival of small and medium-sized firms (Cholezas and Tsaklogou 2008). At the same time, it has been argued that the low-wage labour offered by migrants has affected productivity negatively, in that it encouraged employers to focus on labour-intensive techniques and

delay adoption of new technology. Specifically, it was claimed that the use of cheap, irregular labour in small and medium-sized firms may have contributed to their productivity in the short-term and allowed for their survival, but had adverse consequences for productivity in the long-term.

2. Transformations concurrent with the economic crisis

The economic crisis that has plagued Greece since 2008 has resulted in new twists in the Greek migration experience which have further transformed the social and economic landscape of Greece. While unauthorised inflows are not a new phenomenon, a large proportion of these inflows cannot be incorporated into wage work in the informal sector of the economy as was the case previously. Flows of return migration have accelerated, and the emigration of natives has expanded markedly.

2.1 Continuation of unauthorised flows without incorporation in wage-work

In most countries of Europe, the recent economic crisis has led to a decrease in migration inflows. However, in the case of Greece, the deterioration of the labour market has not resulted in the abatement of unauthorised flows. Before surveying indicators concerning inflows, an examination of the effects of the crisis on the labour market position of migrants is in order.

Before the onset of recession in 2008, migrants in Greece exhibited lower unemployment rates than natives, contrary to the experience of most EU countries. This changed however with the economic crisis. In 2009 the unemployment rate of migrants surpassed that of natives for the first time, while the gap continued to increase through 2011. Specifically, between 2008 and 2011 the unemployment rate of foreign nationals increased from 6% to 18% while the unemployment rate of Greek and Cypriot citizens increased from 7% to 16%. The increase in unemployment was especially sharp among citizens of Albania, whose rate increased from 6% to 21% (Table 3).

A greater increase in unemployment among migrants than among natives during the present economic crisis has been observed in many developed countries that have been hit by the crisis (OECD 2011a, Papademetriou, Sumption and Terrazas, 2010, Ruedin and D'Amato, 2011). In most of these countries, the larger increase of unemployment among migrants is due mainly to the different sectoral distribution of their employment, given that migrants are concentrated in sectors which have been particularly affected by the crisis such as construction, industry and tourism. In addition, in most countries the economic crisis has affected male and female migrants differently, with the unemployment of males exhibiting steeper increases than that of females. These gender differences have been attributed precisely to the different sectoral composition of their employment. While male migrants are concentrated in construction and manufacturing, female migrants are concentrated in the provision of services to households, which have been less affected by the crisis.

Table 3. Population aged 15-64 by gender, citizenship and labour market status, 2008b and 2011b

Both genders

	2008b	2011b	2008b	2011b	2008b	2011b	2008b	2011b	2008b	2011b	2008b	2011b
Labour force status	**Greek and Cypriot**		**Foreign**		**EU 14**		**Albanian**		**Other**		**Total**	
Employed	4,134,760	3,713,245	362,451	366,710	10,766	9,985	197,671	188,054	154,014	168,672	4,497,211	4,079,955
The employed as % of population aged 15-64	61.6	56.0	69.9	61.6	51.3	47.5	68.1	56.9	74.3	69.3	62.2	56.4
Unemployed	332,002	728,473	24,536	80,976	1,212	1,971	13,481	51,282	9,843	27,723	356,538	809,449
The unemployed as % of population aged 15-64	4.9	11.0	4.7	13.6	5.8	9.4	4.6	15.5	4.7	11.4	4.9	11.2
Unemployment rate	7.4	16.4	6.3	18.1	10.1	16.5	6.4	21.4	6.0	14.1	7.3	16.6
Not economically active	2,242,941	2,193,990	131,487	147,285	9,022	9,083	79,086	91,204	43,379	46,997	2,374,428	2,341,275
The non-active as % of population aged 15-64	33.4	33.1	25.4	24.8	43.0	43.2	27.2	27.6	20.9	19.3	32.8	32.4
Total	6,709,703	6,635,708	518,474	594,971	21,000	21,039	290,238	330,541	207,236	243,392	7,228,177	7,230,679

Men

	2008b	2011b	2008b	2011b	2008b	2011b	2008b	2011b	2008b	2011b	2008b	2011b
Labour force status	**Greek + Cypriot**		**Foreign**		**EU 14**		**Albanian**		**Other**		**Total**	
Employed	2,483,982	2,210,982	242,456	221,555	4,705	4,006	143,310	124,457	94,440	93,093	2,726,437	2,432,537
The employed as % of population aged 15-64	74.3	66.5	89.1	73.2	78.9	55.4	87.5	70.9	92,2	77.6	75.4	67.1

Unemployed	127,045	344,240	8,991	48,971	189	544	5,548	31.533	3,254	16,894	136,036	393,211
The unemployed as % of population aged 15-64	3.8	10.4	3.3	16.2	3.2	7.5	3.4	18.0	3.2	14.1	3.8	10.8
Unemployment rate	4.9	13.5	3.6	18.1	3.9	11.9	3.7	20.2	3.3	15.4	4.8	13.9
Not economically active	731,944	767,924	20,735	32,309	1,070	2,686	14,983	19,635	4,681	9,988	752,679	800,232
The non-active as % of population aged 15-64	21.9	23.1	7.6	10.7	17.9	37.1	9.1	11.2	4.6	8.3	20.8	22.1
Total	3,342,971	3,323,146	272,182	302,835	5,963	7,235	163,842	175,625	102,376	119,975	3,615,152	3,625,981

	Women											
Labour force status	**2008b**	**2011b**	**2008b**	**2011b**	**2008b**	**2011b**	**2008b**	**2011b**	**2008b**	**2011b**	**2008b**	**2011b**
	Greek + Cypriot		**Foreign**		**EU 14**		**Albanian**		**Other**		**Total**	
Employed	1,650,778	1,502,263	119,995	145,155	6,061	5,979	54,361	63,597	59,574	75,579	1,770,774	1,647,418
The employed as % of population aged 15-64	49.0	45.4	48.7	49.7	40.3	43.3	43.0	41.1	56.8	61.2	49.0	45.7
Unemployed	204,957	384,233	15,545	32,004	1,023	1,427	7,932	19,749	6,589	10,828	220,502	416,237
The unemployed as % of population aged 15-64	6.1	11.6	6.3	11.0	6.8	10.3	6.3	12.7	6.3	8.8	6.1	11.5
Unemployment rate	11.0	20.4	11.5	18.1	14.4	19.3	12.7	23.7	10.0	12.5	11.1	20.2
Not economically active	1,510,997	1,426,067	110,752	114,976	7,952	6,398	64,103	71,569	38,697	37,009	1,621,749	1,541,043
The non-active as % of population aged 15-64	44.9	43.1	45.0	39.4	52.9	46.3	50.7	46.2	36.9	30.0	44.9	42.8
Total	3,366,732	3,312,563	246,293	292,135	15,037	13,804	126,396	154,916	104,860	123,416	3,613,025	3,604,698

Source: Unpublished Labour Force Surveys (EL.STAT.), author's calculations.

Examination of the Greek data reveals the same pattern, with impressive differences between genders. Not only did the unemployment of migrant women increase less than that of migrant men (by 6% and 14% respectively) (Table 3), but their employment rate actually increased (from 49% to 50%), reflecting an increase in their labour force participation. The same trend of increase in participation and employment rates of female migrants during the economic crisis has been observed in other countries of the EU (OECD 2011a), and has been interpreted as an attempt by women to offset the loss of employment by male members of families or households.

The sharp increase in the unemployment of migrants was not accompanied by a decrease of migrant flows into Greece, as in other developed countries. On the contrary, heavy inflows continued, and Greece maintained its unenviable status as the main gateway of illegal migration into the EU. According to Frontex (frontex.europa.gr), the European border management agency that has been involved in patrols of Greek borders over the last years, in 2008 about 50% of illegal entries into EU countries were through Greek borders, increasing to 75% in 2009 and to 90% in 2010.

It should be noted that a large proportion of the migrants who attempt to enter illegally are propelled by difficult conditions in their country of origin and do not aim to remain in Greece but rather to continue on to another country of the EU. Greece is a target for entry into the EU because it forms an external border of the EU and its borders are not effectively controlled. According to a recent field study (Triandayllidou and Maroukis 2012), only about 1 in 10 of the irregular migrants who arrived in Greece between 2005 and 2011 managed to cross into Western Europe.

Main points of unauthorised entry have shifted over time. Up until 2008 Greece's land borders with Albania constituted the main point of attempted entry, but then the main pressure point became the Aegean sea borders with Turkey and next, after effective collaboration of Frontex and Greek authorities in the Aegean, the pressure point was diverted to Greece's land borders with Turkey along the Evros River. According to Frontex, most migrants intending to cross the Greek land border travel first to Istanbul, from where they are transported by people-smugglers to the Evros River.

In the summer of 2012, nearly 2,000 more Greek officers were deployed to the land border to reinforce the joint mission with Frontex, amid fears of a surge in migration from Syria as result of the crisis there. The new efforts, together with the new fence erected along the Evros River, appear to have brought results. While in the first seven months of 2012 more than 55,000 unauthorised migrants were arrested for illegal entry and residence by police and harbour authorities, compared to 48,000 in the first seven months of 2011 (an increase of 16%), by the end of 2012 the total arrests for the year were fewer than those for 2011, reaching approximately 77,000 as opposed to 99,000 in the previous year. It appears, however, that more effective control of the land border has shifted migration pressure once again to the sea borders of Greece and Turkey.

Until the recent noteworthy improvement in border protection, the unauthorized population appears to have expanded substantially, with countries of origin chiefly in Asia and Africa. It should be noted, though, that the expansion of the undocumented population is the result not only of unauthorized inflows but also of the reversion of documented migrants to undocumented status. Renewal of work permits requires proof of employment and social insurance payments. Lapse into irregularity has increased with the economic crisis because finding employment in the formal sector with social security stamps has become ever more difficult. As has been noted, when examining the impact of the economic crisis on flows, it is important to look not only at flows in and out of Greece, but also at shifts in legal status of those remaining in Greece.

Therefore, main features of migrant flows to Greece in the last decades have been their illegal character and the inability of authorities to bring them under control. Legal inflows have accounted for only a very small proportion of total inflows, owing to the very narrow channels for legal migration and to the very bureaucratic procedures it entails (Cavounidis 2008). Formerly, the policy of regularisation of undocumented migrants was used by the state to cope with the results of these failures. Most migrants legally present in Greece today were previously on Greek territory illegally and acquired their permits through participation in the regularisation programmes of 1998, 2001 or 2005. A repeat of a mass regularisation programme is not a prospect, owing not only to current high levels of unemployment among both natives and migrants but also to the strong objections voiced in recent years to such programmes in numerous EU capitals after the last implementation of regularisation in Spain in 2006.

It is very difficult to estimate the size of the unauthorised population present on Greek territory today. Two separate systematic efforts (Lianos *et al.* 2008; Maroukis 2008) to gauge its extent in the year 2007 placed it close to 200,000. A more recent assessment placed it around 350,000 (Maroukis 2011).

It appears that a large proportion of the new undocumented population is not incorporated into wage-work as were previous waves of migrants, but remains unemployed or participates in small-scale entrepreneurial activities, often illicit and highly visible on the street. Migrants without permits to engage in commerce are often involved in the sale of counterfeit goods, especially copies of designer handbags. For example, on the main commercial street of Athens, Ermou St., migrants spread their wares on cloths, playing a cat and mouse game with the police officers who periodically appear. Since 2011, a new common daily scene in the centre of Athens has been that of migrants pushing grocery carts from one trash bin to the next, scavenging for objects to be sold as scrap metal. Thus, the activities of recent migrants who have arrived during the crisis appear to be very different from those of past waves of migrants, who were incorporated into wage-work in construction, manufacturing, commerce, agriculture, and homes.

Not only have the economic activities of migrants become more visible to the public eye, but also their residences and gathering spots in public places have become increasingly concentrated in specific areas, thereby transforming urban space. Until the late 2000s, Greek social geographers continued to remark on the lack of formation of ghettoes in Athens and the relatively even distribution of migrants across urban space compared to other major European cities (e.g. Maloutas 2007). The only notable pattern of social segregation ascertained was that described as "vertical segregation", with the higher floors of apartment buildings being occupied by the more affluent, the lower floors by the less affluent, and the basements by migrants.

2.2 Expansion of return migration

The onset of the economic crisis and the deterioration of conditions in the Greek labour market since the end of 2008 have spurred return migration. The size of return flows is difficult to estimate but there are several indications of this trend.

One indication of return flows is the decrease in the size of the authorised migrant population. The number of non-EU foreign nationals holding residence permits, excluding those with permits for seasonal permits, increased in all years between 2004 and 2009 but their number decreased by about 100,000 between December 2010 and December 2011. Specifically, the authorised population dropped from approximately 603,000 at the end of 2009 to 448,000 at the end of 2011 (General Secretariat of Population and Social Cohesion 2011). As previously mentioned, some migrants may have lapsed from authorised to unauthorised status, and some of these may have remained on Greek territory. However, most of the decrease is probably related to return migration, whether by migrants who chose not to renew their permits or were unable to renew their permits.

On the other hand, data from the Labour Force Survey (LFS) show an increase in the population of migrants aged 15-64 between 2008 and 2011 (Table 3). It should of course be noted that the LFS is a sample survey of all households of Greece, regardless of the legal status of household members and also that it is generally acknowledged that migrant households have been under-represented in the specific survey while a large part of the increase they have shown in recent years can be attributed, according to an ELSTAT official, to improvement of their coverage in the survey. In any case, it is of course entirely possible that return migration prompted by the economic crisis was underway concurrently with continued unauthorised migrant inflows.

Apart from residence permits, other types of information have also been drawn on as evidence of a trend of return migration resulting from the economic crisis. For example, with respect to Albanians, the largest migrant community in Greece, the Albanian Foundation of International Studies estimated in 2011 that about 15% of the approximately half million Albanians in Greece had departed in recent years (Unit for Migration Studies, 2011).

Some indication of desire for return migration is provided by the great interest in the voluntary return migration programmes organised by the Athens office of the International Organisation for Migration in 2010 and 2011 for unauthorised migrants and migrants who had applied for asylum. Applications far outstripped places in the program. It was expected that the main nationalities participating in the new programme that began in 2012 would be Afghanis, Pakistanis, Moroccans, Bangladeshis and Iraqis.

The economic crisis no doubt has different effects on the migratory plans of various groups of migrants according to their legal status, the length of time they have stayed in Greece, and their family situation. For migrants who have developed longstanding ties with Greek society, such as through creation of a family, return to country of origin is difficult. On the other hand, unauthorised migrants may have fewer incentives to stay but at the same time may be reluctant to depart since it would be very difficult for them to return to Greece in the future.

2.3 New wave of emigration by Greeks

The sharp increase in unemployment in the Greek labour marketsince the last trimester of 2008 together with the worsening of terms of employment have caused many Greeks to seek employment abroad, especially younger population groups that have been characterized by particularly high unemployment levels and have not yet created families or other obligations. This turn toward employment abroad appears to mark a shift in the Greek migration experience and specifically that the conversion of Greece, from a sender of migrants to a receiver of migrants two decades ago, has now been followed by its transformation into a sending country once again.

The large increase in unemployment among Greek and Cypriot citizens aged 15-29 and 30-44 in the Greek labour market can be seen in Table 4. While unemployment in these age groups was high previous to the crisis, between the second trimester of 2008 and the second trimester of 2011 unemployment among men aged 15-29 increased from 12.6% to 29.3% while among women in the same age group from 20.5% to 38%. In the age group 30-44, unemployment increased from 3.7% to 11.6% for men and from 10.4% to 18.7% for women. As can be seen, a sharp increase in unemployment characterised all educational groups, including those with tertiary degrees and postgraduate degrees, despite the fact that such degrees are often considered the strongest "weapon" in times of economic crisis and high unemployment (OECD 2011b). Moreover, Eurobarometer survey data indicate that perceptions of Greeks concerning the future of their personal job situation are particularly negative. Of the 27 EU countries included in the survey, Greece showed the largest increase (30%) between 2006 and 2012 in the proportion of the population that expected their personal job situation to worsen over the next year (Bertoli, Brucker and Fernandez-Huertas Moraga 2013).

Table 4. Unemployment rates among population of Greek and Cypriot citizenship with completed education, by educational level, gender and age group

	Men				**Women**			
	15-29		**30-44**		**15-29**		**30-44**	
	2008b	**2011b**	**2008b**	**2011b**	**2008b**	**2011b**	**2008b**	**2011b**
Ph.D. or Master's degree	20,9	45,5	4,6	7,7	11,1	21,6	3,9	9,3
Upper tertiary	13,9	33,6	3,1	7,4	19,3	35,0	4,7	12,1
Lower tertiary	14,1	31,6	3,7	9,8	19,7	35,2	12,1	21,0
Lyceum	12,0	25,8	3,9	11,2	22,2	40,2	10,9	20,6
Gymnasium	10,7	31,6	3,5	15,8	25,5	54,0	16,4	21,7
Primary or less	11,0	30,3	3,7	18,4	21,6	58,2	14,8	25,3
Total	12,6	29,3	3,7	11,6	20,5	38,0	10,4	18,7

Source: Cavounidis (2012a)

In the past, the Greek Statistical Authority published data on the emigration of Greeks as well as on their return migration. Unfortunately there are no such data available today. Likewise, the office of the International Organisation for Migration (IOM) in Athens that dealt with the migration of Greeks in the 1950's, 1960's and 1970's to Australia, Canada, the United Sates and other destinations, no longer keeps data on Greeks and focuses exclusively on the migration of foreigners to Greece. In recent years the Greeks who have contacted the IOM about leaving Greece have been referred to embassies and consulates of the countries of interest. According to the IOM office in Athens, the main countries attracting the attention of prospective Greek migrants in 2012 were Germany, Australia and the United States, as well as some countries of the Middle East.

Data of the German Federal Statistical Office indeed exhibit a steep increase in the number of Greeks residing in Germany. During the first six months of 2011, the number of Greek citizens moving to Germany increased by 84% compared to the same months of the previous year. The German statistical service reported that migrant inflows were particularly large from countries of the EU that had been seriously affected by the economic crisis, but the data showed that the increase in inflows of Spanish citizens was smaller than that of Greece – Spanish inflows increased by 49%, compared to Greece's 84%. In the first six months of 2012, Greece exhibited the steepest increase in new migrants to Germany, with 15,700 arriving, representing an increase of 78% over the first half of 2011. In comparison, the 11,000 arrivals from Spain in the first six months of 2012 represented an increase of 46% over the same period of the previous year (www.spiegel.de 15.11.2012)[4].

4. It should be noted, however, that in absolute numbers, Poland, Romania and Bulgaria were the main source countries of immigration to Germany over this period. It should also be noted that present levels of Greek migration to Germany are only slightly higher than those observed before Greece entered the Eurozone (OECD 2012).

According to results of the Gallup World Survey carried out between 2008 and 2010, 19% of the Greek population wished to move abroad permanently and 18% of these would have liked to move to Germany (OECD 2013). Of the total Greek population, 3.5% would have liked to move to Germany, rendering it the number-one preferred destination among Greeks. However, unlike other Southern European countries that were in the throes of economic crisis from 2008 and were also sending migrants to Germany, enrollment in Goethe Institute's German courses did not increase impressively in Greece between 2010 and 2011. Specifically, enrollment increased by 7% compared to 38% in Spain, 22% in Portugal and 14% in Italy (OECD 2013). Nonetheless,the sales of the German bookstore in Athens appear to have expanded substantially.

A statistical analysis (Bertoli, Brucker and Fernandez-Huertas Moraga 2013) of migration flows from countries of Southern and Eastern Europe to Germany and the importance of deterioration of conditions in alternative destinations revealed that in the case of Greece, approximately 33% of the change in migration flows to Germany between 2007 and June 2012 could be attributed to current economic conditions, as indicated by evolution of the unemployment rate, and about 11% to expectations about the future of the Greek economy, as indicated by 10-year bond yields. On the other hand, 61% of the change in flows was accounted for by "diversion effects"; in other words, Greek migrants who would have gone elsewhere ended up in Germany because of (negative) events or developments in other potential destinations[5].

Another indication that Greeks are seeking employment abroad is the rapid increase in their registration on the website EURES, the gateway of European mobility in which public employment agencies (such as the Greek OAED) of the European Economic Area countries participate. Specifically, in October 2011, more than 20,000 Greeks had posted their CVs on the site, while in November 2010 there were fewer than 11,5000 (*Vima* 16.10.2011). According to the relevant data, all population groups exhibited an increase, but particularly those under 35 with higher education. A parallel increase in Greeks is observed with respect to numbers completing CVs for the Europass service, which like EURES was designed to facilitate labour force mobility. More particularly, in 2011 the number of Greek CVs doubled, from 46,400 in 2010 to 89,3000 by November 2011 (*Kathimerini* 16.12.2011).

Flows of Greeks to European countries in recent years have included many highly skilled professionals, including doctors. According to data (Bank of Greece 2012), 282 Greek doctors migrated to the United Kingdom in 2010 and 365 in 2011, while in the respective years 153 and 208 Greek doctors and related professionals migrated to Germany.

5. It should be noted that the diversion effects were found to be particularly strong in the case of Romanian migrants (99%), whose main destination country had been Spain until it entered recession.

The search for employment in Australia also appears to have increased significantly. The plethora of telephone calls to the Australian embassy in Athens prompted the organisation of five informational meetings in Athens in the autumn of 2011 about occupational skills in shortage in Australia, most of which require many years of education or training, such as in the medical professions. About 15,000 individuals requested to attend the meetings but invitations were extended only to about 1,250 who had relevant qualifications. Due to various requirements and restrictions, there has not been an increase in the number of migration visas granted to Greek citizens, despite the wide interest. According to data of the Australian Department of Immigration, only 15 Greek citizens arrived in Australia for permanent residence as skilled labour force in the financial year 2011-2012, compared to 35 in 2008-9, 26 in 2009-10 and 14 in 2010-11. On the other hand, arrivals of Greek citizens for permanent residence in Australia due to family reunification showed an increase: from 96 in 2008-9 to 93 in 2009-2010, 119 in 2010-11 and 139 in 2011-12. Obviously, these numbers are much smaller than suggested by the recent prominence given in the Greek media to the new tendency of Greeks to migrate to Australia.

A study of the migration of Greek tertiary graduates (Lambrianidis 2011) estimated that in 2010 approximately 110,000 to 135,000 Greek graduates worked abroad, or 8.5% to 10.5% of all such graduates who lived in Greece. It was ascertained that the completion of studies abroad reduces the length of time required to find employment abroad.

It should be noted that the current trend of reconversion into a migrant-sending country characterises not only Greece but also other countries of Europe that underwent transformation from sending to receiving countries in the last decades of the 20th century. More particularly, in 2011 increased migration propensity among natives with advanced degrees and skills was observed in both Spain and Ireland, although there were no specific data which could document the volume of migration (Migration Information Source, December 2011).

How does the present wave of emigration of Greeks compare with the emigration of Greeks in the postwar decades? A first dimension of comparison is the determining factors of migration. Poor labour market conditions were also the main drivers of the emigration of Greeks in the postwar decades. Statistical analysis of migrant flows from Greece to the United States, Canada, Australia and Germany between 1959 and 1977 showed that unemployment levels were important determinants of the outflows (Lianos and Cavounidis 2012). Of course it is not only the high levels of unemployment that are currently creating migration supply of Greeks, but also related factors such as the negative outlook for the Greek economy in upcoming years and the resulting gloomy prospects for career trajectories.

Second, the countries of destination that have attracted potential Greek migrants coincide to a large degree in the two periods. As in the past, countries of Northern Europe and especially Germany are migration targets, as are overseas destinations such as the United States, Canada and Australia, even though legal migration to these latter destinations is now proving difficult for present-day migration candidates. Unlike the past, some countries of the Middle East have emerged as attractive destinations for some potential migrants.

Third, as for volume, the extent the present wave will take is unknown but it would appear difficult for it to surpass the postwar exodus. For example, approximately one million Greeks migrated to West Germany between 1960 and 1985, or 11.5% of the population of Greece as recorded in the 1971 census (Lianos and Cavounidis 2012).

Fourth, as for the characteristics of those migrating, it appears that there will be major differences between the two waves of emigration. Today the supply of migration is especially intense among well-educated youth while the labour demand in their desired countries of destination is principally for high-skilled labour contrary to the postwar experience in which most Greek emigrants had limited education and migrated in response to demand for unskilled labour in Germany and elsewhere, just as emigrants from other Southern European countries to Northern European countries in the postwar decades. Of course, a related difference from the postwar experience is that the present outflow of Greek nationals coexists with an inflow of migrants seeking low-skilled work.

Fifth, as for spatial patterns of settlement, the new wave of migrants will probably exhibit lesser concentration in specific neighborhoods, towns and cities of destination countries than Greek migrants of the past. Today, a large part of the search for employment is carried out over the internet rather than through personal networks of kin and co-villagers – as in the past – who not only found jobs for new migrants but also aided them in the settlement process. Moreover, globalization and the convergence of social and cultural experiences, particularly among educated youth, would presumably weaken preferences to reside in close proximity with co-ethnics.

As yet, there are few indications as to the type of connections - which were intense among previous waves of emigrants - that the new diaspora will maintain with Greece. Nor is there evidence as to the extent to which the new opportunities offered the Greek economy by the presence of a new diaspora abroad will be effectively exploited.

As for return migration of Greeks, it remains to be seen what levels it will reach and how they will compare with those of previous waves of Greek migrants. Over the period 1968-1977 approximately 449,400 Greeks emigrated, while 237,500 Greek migrants returned, yielding a return rate of 53% (Lianos and Cavounidis 2012). Of course, some of the return migrants in that period had emigrated in a previous period, while some of the emigrants in that period could have returned later. The absorption rate (representing stay versus return) differed by country of destination, with the United States exhibiting the highest absorption (78.4%), followed by Canada (66.9%), Australia (50%), and Germany (45%).

Whatever the return rate, there is little doubt that the experience of emigration is once again transforming the economic and social landscape of Greece. This time it may not devastate entire villages, as it did in Northern Greece in the postwar decades, but with the exodus of large numbers of highly educated and skilled youth, it will undoubtedly alter the human capital composition of the population of Greece.

Conclusion

The economic and social landscape of Greece was transformed by the massive inflows of migrants that commenced subsequent to the collapse of socialist regimes in Central and Eastern Europe while the economic crisis that Greece has faced since 2008 has added new twists to this transformation. It remains too early to assess the full impact of the dimensions of transformation examined in this paper.

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ASECU South-Eastern Europe Journal of Economics 1 (2013) 79-100 SEEJE

DETERMINANTS OF NIGERIA'S NON-OIL IMPORT DEMAND

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Abstract
Primarily, the study assesses the determinants of non-oil import demand in Nigeria. This is aimed at measuring the relative strengths and nature of effects of the variables that determine Nigeria's non-oil import demand, and subsequently assessing the extent to which results are in conformity with those previously obtained on a wider aggregate of the Nigerian economy. An econometric method of analysis was employed. Results indicate deviations from the findings of earlier studies, as two key variables previously reported as significant (real exchange rate and real income) showed insignificant causational relationships in the model.

JEL Classification: C32, F14, F17
Keywords: Non-Oil Import Demand, Econometric Model, Static Specification, Insignificant Relationship, Nigerian Economy.

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1. Introduction

Nigeria, according to Okoh (2004), embraced globalization as one of the founding members of the world trade organization (WTO), the body that is currently charged with the responsibility to remove all barriers to trade between the nations of the world, so that the whole world becomes "one big" global market. This in Mackinnon's (1994) view underscores the importance of foreign trade in the development process, and has been of interest to development economists. These interests may have been necessitated by increasing disequilibrium in Balance of Payments (BOP), generated from such unification of markets, and how this is transmitted promptly and widely to the rest of the economy. Of the two forms of disequilibrium in trade, negative disequilibrium happens to be the more worrisome case, and is the common feature of most developing economies. This is as a result of their dependence on imported manufactures, as against their reliance on export of primary products. To manage this adverse situation, knowledge of variables to which imports respond in a given market economy provides valid information on how, and possibly the extent to which this form of disequilibrium in trade can be corrected in an economy. This in Egwaikhide's (1999) view may have prompted several authors to be preoccupied with the determinants of import in developing countries, with the result that a number of functional specifications have been explored.

As a developing economy, Nigeria has had her own share of high nominal value of aggregate import over the years. This has been the order since independence in 1960, and has been made worse by the oil boom of the 1970s that gave rise to an increase in average income, and subsequently increase in the demand for import. Evidence shows a concentration of these import volumes on the side of the non-oil sector, such that non-oil imports have over time been on a steady growth path. The nominal value of non-oil imports rose from an average of ₦36.55 billion, representing 96.8% of total import into Nigeria within the period 1970-1979, to ₦118.36 billion, representing 93.4% of total import in the period 1980-1989, ₦3.48 trillion in the period 1990-1999, representing 79.9% of total import and ₦19.33 trillion, representing 82.0% of total imports over the period 2000-2008/2. These represent an average growth rate of 22%.

This growth in the value of imports has in the literature been attributed to a number of factors which include expansion in crude oil exports that considerably raised foreign exchange earnings, the over-valuation of the naira during the period of controls, and liberal trade policies, born out of the desire to provide capital goods and raw materials for import substituting industries; both of which made access to imports easy. Again the expansion of domestic absorption which reveals supply inadequacies in the system, such that aggregate demand outweighs supply. To make up for the supply shortfalls and cut down on the surging inflationary consequences, Nigeria relied on imports, to the extent that imports as a component of total trade, particularly non-oil imports, have persistently been on a steady rise, resulting in deficits in Nigeria's overall trade Balance of Payments, (See Moro, 1995; Egwaikhide,1999; Oyinlola *et al.* 2010).

A critical examination of this, leaves no one in doubt that these deficits emanated from the non-oil sector. The sector has been growing in deficits since 1960, except in 1969 when it made a contribution of ₦2.4 million naira surplus to Nigeria's overall trade Balance of Payments. The rate of growth of these deficits on aggregate term in the sector has also produced a staggering figure. From the period 1970-1979 to 1980-1989, the growth rate was 69%, from 1980-1989 to 1990-1999, the growth rate stood at 97%, while the growth rate within the period 1990-1999 to 2000-2008 stood at 82%. This shows the extent of abuse of our oil surpluses in the overall trade balance.

The adoption and implementation of various import control measures during the era of controls by the authorities could not solve the problem, then Nigeria opted for exchange rate deregulation in 1986 as a way out of it. Import control measures during the period of controls include the import substitution strategy of industrialization, high tariff rates with outright ban on some categories of commodities, coupled with the use of administratively determined exchange rate. It is of note that the objective of import control has over the period been in conflict with the objective of maintaining a steady price level. Whenever this was the case, the government has opted for measures that will ensure steady price levels as against measures for the control of imports (Egwaikhide, 1999). The consequence of this is the fact that non-oil imports remained on a steady rise, with no solution yet in sight.

Interestingly, past studies like those by Ajayi (1975), Egwaikhide (1999), Aliyu (2001), and Aliyu (2007) revealed that some variables like real income, real exchange rate, foreign exchange are the main determinants of Nigeria's imports. None of these studies exclusively focused on the non-oil sector of the Nigerian economy. Therefore the view here is that these studies on the determinants of Nigeria's imports, the estimates of which were carried out on a wider aggregate, might have been plagued by the expected influence of the oil sector on the Nigerian economy. The outcome of these studies may not perfectly explain events in the non-oil sector, hence the need to carry out a similar study to explain events in the non-oil sector.

In light of this, the study seeks to assess the effects of the major components of Nigeria's non-oil import demand function, with a view to ascertaining the determinants of non-oil imports in Nigeria. To be able to accomplish this task, the study will address the following research questions: What are the determinants of Nigeria's non-oil import demand? What are the magnitudes of the elasticities of non-oil import demand function in Nigeria? In the attempt to provide answers to these questions, the broad objective of the study will be to investigate the determinants of Nigeria's non-oil import demand. Specifically the study seeks to ascertain the variables that determine Nigeria's non-oil import demand, and to estimate the size of elasticities of non-oil import demand function.

1.1 Scope and Policy Relevance

The study will exclusively focus on the non-oil sector of the Nigerian economy. Annual data spanning the period 1970 to 2010 will be employed. The choice of range of period is informed by availability of data. Findings from the study will enable us assess the extent to which estimates are in conformity with those previously obtained by earlier studies. It is expected to provide empirically predictive estimates of non-oil import demand, necessary for the provision of valid and reliable information on how best to regulate the volume of Nigeria's non-oil import demand, in the midst of growing income, and by extension provide policy option(s) for the regulation of Nigeria's Balance of Payments position.

2. Trade Policies and Import In Nigeria: An Overview

Iyoha (1986) reports that in Nigeria, the major instruments of trade and commercial policy are tariffs, quota, and export and import prohibitions, exchange rate determination, import, debt management as well as cartel arrangements. Exchange rate determination is often adopted as an important instrument of trade and commercial policy. This is because foreign exchange plays a major role in all international economic transactions, being the means of offsetting payments.

2.1 SAP and Trade Performance

According to Gbosi (2003), Nigeria's foreign trade policies prior to the adoption of SAP in 1986 were aimed at striking a balance between promoting domestic production, controlling the effects of domestic shortage of certain essential commodities and generating revenue for government expenditures. It specifically consisted of quantitative import controls administered through a comprehensive import licensing system, and selectively high tariffs frequently imposed on the basis of the perceived needs of the country. Quotas were also used to quantitatively restrict imports, while high duties were placed on agricultural commodities and luxuries (50 – 100 percent, and 150 – 200 percent respectively), while capital and raw material goods attracted low duties (5 – 10 percent and 15 – 20 percent respectively). In addition to direct trade control, Gbosi (2003) opines, the exchange rate was administratively determined. This was to ensure cheap inputs especially of raw materials for local manufacturing import-substituting industries. As a result, the naira was generally over-valued by as much as 30 – 45 percent in real terms between 1978 and 1983.

The Structural Adjustment Programme (SAP) was adopted in July, 1986 against the background of the crash in the international oil market, and the resultant deteriorating economic conditions in the economy. One of the policy instruments of SAP is Trade Liberalization. By this, one means the gradual removal of restrictions on trade. It was designed to achieve fiscal balance and balance of payments viability by altering and

restructuring the production and consumption patterns of the economy, eliminating price distortions, reducing the heavy dependence on crude oil exports and consumer goods imports, enhancing the non-oil exports base and achieving sustainable growth among other objectives. The main strategies of the programme were the deregulation of external trade and payments arrangements, the adoption of a market-determined exchange rate for the naira, substantial reduction in complex price and administrative controls, and more reliance on market forces as a major determinant of economic activities.

The objective of finding a realistic exchange rate which could match the demand for foreign exchange with supply, under SAP would have the effect of making imports more expensive, and exports cheaper, and by so doing curtailing the volume of imports. This process of deregulation coupled with an appreciable degree of openness during the SAP era made the economy vulnerable to international trade shocks and widening of the size of disequilibrium in Balance of Payments (BOP). Eqwaikhide (1999) shows that between 1953 and 1989 imports as a proportion of GDP did not fall below 10% except for 1974 and 1986. Furthermore there is evidence of increasing deficits in the Balance of Payments (BOP) ever since SAP was introduced (See Aliyu, 2007).

2.2 Trends of Variables and Non-oil Import Responses

From the foregoing analysis, two distinct periods are rightly observed in Nigeria's external trade, within the period under study: the period of control (embodying direct trade controls and use of administratively determined exchange rates) and the period of liberalization of trade. As a matter of necessity, this section takes analysis of behaviours of variables in the model over the period, and how non-oil imports are affected.

An examination of the individual trends of variables in the model indicates that: from 1970 to 1982 GDP for instance increased significantly. Beyond this period, it recorded infinitesimal increment above the successive period's level. In response to this behaviour, non-oil imports increased at a relatively low rate up to 1982, decreased till 1986 and began to increase again - this time at a higher rate. In another instance, trade policies in place prior to the liberalization of trade in 1986 brought about slight changes in the level of real exchange rate (mainly in the upward direction), and non-oil imports responded by the controlled increases observed within same period. After 1986, the real exchange rate became relatively stable over time, but non-oil imports increased significantly. From an examination of Nigeria's level of foreign reserve, one can rightly observe that there has been continuous increases in the behaviour of the variable (level of foreign reserve) over the entire period under study. Non-oil imports in response, have continuously tracked these observed increases over the period. An analysis of the effect of the openness of the economy indicates that increases in the degree of openness gave rise to increases in the level of non-oil imports; between the years 1970 to 1986, the various import control measures adopted during the period of

control were able to curtail increases in the level of non-oil imports to an appreciable level. On the other hand, the liberalization of trade in 1986 resulted in an unprecedented rise in the level of non-oil imports. As for the foreign exchange component of the model (level of import capacity), there is really no definite pattern in the trend of Nigeria's level of import capacity over the period, therefore one cannot quickly attribute changes in the level of non-oil imports to changes in the level of import capacity.

In summary, one can rightly observe that while Nigeria's level of foreign reserve and degree of openness of the economy relatively have strong positive effects on the level of non-oil imports, the real exchange rate has weak effects; which is positive at the period of control, but relatively negative under trade liberalization. The effect of real GDP and level of import capacity cannot be ascertained from the trend analysis. However, it is observed that non-oil imports generally performed more poorly during the period of control, as a result of various import control measures that were in place then, than during the period of liberalization of trade. (see Figure I)

3. Literature Review

3.1 Theoretical Literature

Several theories exist in the literature that offer explanations on import demand function. The argument put forward by each of these theories/models is useful, coherent and at the same time convincing, yet they are not far from each other. A strand of these (The Production Theory) argues that the demand for imports can be derived from production theory and there is no need to model final demand, given the nature of international trade where traded goods are either used in other production processes or go through a number of domestic channels before reaching the consumer. Another (The International Finance Theory and Policy) maintains that imported goods are not a part of domestic Gross National Product (GNP). It assumes that consumption, investment, government and export demand are included in demand for imported goods. A third strand (The Stock Adjustment Import-Exchange Model) assumes that the basic objective is to minimize the cost of discrepancies between actual and desired levels of both imports and international reserves, which is expressed in a quadratic form. In another line of argument, another school of thought (The Centre-Periphery Model) examines international trade as a whole, in an attempt at explaining the widening international differences in the level of development between the developed and developing countries. It concludes that through the means of labour migration, capital movements and trade, international inequalities are perpetuated in exactly the same way as regional inequalities within the nations. The last although not the least school of thought reviewed, (The Simple Import Demand Model) advocates the inclusion of the foreign exchange component in the import demand function, on the ground that most less developed countries (LDCs) suffer from foreign exchange scarcity, such that it is necessary to include it in the import demand function as a determinant of their ability to import goods and services.

Among these theories, the simple import demand model best suits analysis of non-oil imports in Nigeria, it being a developing economy. The production theory and international finance theory are not of interest, because their assumptions are more suitable for industrialized economies. That of Hemphill (1974), (The stock adjustment import-exchange model) as adopted by Egwaikhide (1999) is also not of interest because it incorporates the phenomenon of import substitution; a development strategy that relies heavily on imported inputs for production. Nigeria had abandoned this development policy in the 60s. Again, the Prebisch model is more or less an analytical framework explaining the nature and pattern of trade between the developed and developing economies

3.2 Empirical Evidence

The need to ascertain the extent to which theoretical underpinnings are in consonance with empirical findings leads us into an excursion into the views and findings of other scholars in the area of the study. The models that are of importance and will be instrumental guides in charting the course of the study's investigation are those of Olayide (1968), Learner and Stern (1970), Khan (1974), Ajayi (1975), Warner and Kreinin (1983), Thursby and Thursby (1984), Ozo-Eson (1984), Bahmani-Oskooee (1986), Olopoenia (1991) Kotan and Saygili (1999), Egwaikhide (1999), Aliyu (2001), Aliyu (2007) and Omejimite and Akpokodje (2010).

The pioneering efforts of Olayide (1968) to model the determinants of aggregate imports in Nigeria focused on only some selected commodities of Nigeria's imports in the period 1948-1964. Evidence from multiple regression models indicate that terms of trade, real income (measured by GDP) and the index of trade restrictions had fairly good parameter estimates. Unfortunately given that the study focused exclusively on some selected commodities, it is expected that the economic factors facing demand for these commodities might well not be the same as those of commodities outside the list. Therefore, results obtained may not be valid for those not included in the study. Secondly, the fact that the study measured real income in terms of absolute value of GDP, limits the validity of the result obtained. Learner and Stern (1970), used the basic imports demand model that relates imports to income and relative prices; a model that has been criticized by several authors. For instance, Burgess (1974) argued that although the traditional imports demand model is able to provide measures of income and price elasticities, it assumes that total imports consist of final commodities that are not separable from those other goods that serve as inputs to the consuming sectors. Even the appropriate measure of both the dependent variables are not provided by theory. Thus it is not surprising according to Egwaikhide (1999) that various authors have used different price indexes and functional forms in the aggregate imports demand model. Khan (1974), in his import demand model for individual countries using annual data, investigated the period 1951-1969. Employing the popular OLS technique for

his analysis, with the variables specified in logarithmic terms, he found that relative prices play an important role in the determination of imports for developing countries. Warner and Kreinin (1983), have also employed a similar model to that of Khan (1974), but their approach differs from that of Khan (1974) in two respects; first there are two distinct investigation periods, (the period of fixed and flexible exchange rates regimes), to analyse the behaviour of the variables in the two periods. Secondly, Warner and Kreinin estimated the import demand function employing the OLS technique as Khan did, but they also repeated the estimation after excluding petroleum products to remove their influence on the results. The results of the investigation reveal that the introduction of floating exchange rates appeared to have affected the volume of imports in several countries, but the direction of change varied between them. Some other studies carried out in the context of developing economies and Nigeria in particular, studies like: Ajayi, (1975), Ozo-Eson, (1984), Bahmani-Oskooee, (1986), Olopoenia, (1991), Kotan and Saygili, (1999), Egwaikhide, (1999), Aliyu, (2001), Aliyu (2007), apart from relative prices, further reported significant impact of some other variables such as real exchange rate, money supply, foreign reserve, real income, foreign exchange, real expenditure as factors that determine the level of imports in Nigeria. These studies are, however, limited by the fact that many of them (see for instance Olopenia, 1991; Egwaikhide, 1999; Aliyu, 2007) considered the demand for imports within a larger model. Estimates obtained from the models employed in these studies cannot perfectly explain events in the non-oil sector. Furthermore, Olopoenia specifically related imports functionally to real expenditure and real exchange rate - a formulation based on the monetary approach to the Balance of Payments. In it, the choice of the variables were largely dictated by the objectives of the macro-econometric model developed, which may not be same as some other models.

Given developments in econometric modeling and the fact that there is no universally accepted model of imports demand that can fit all or capture the dynamics in different countries, the models have undergone a number of refinements in recent times. According to Aliyu (2007), Learner and Stern (1970) note that there are no well-defined criteria for choosing a particular functional relationship/specification. Rather it is the researcher who decides what functional form to use (influenced by the theoretical position chosen), provided the choice is not harmful to the results obtained. Concerned about the issues arising from the various functional imports demand models, Thursby and Thursby (1984) - cited in Egwaihide (1999) - examined the appropriateness of alternative specifications, using five countries (Canada, Germany, Japan, United Kingdom and the United States) as case studies. They explored nine different models of aggregate imports demand from which 324 alternative specifications were derived. Furthermore, Aliyu (2007) stated that the general conclusion from this detailed research is that there is no single functional form that is universally appropriate across countries over times. The paper argued that Thursby and Thursby (1984) further discovered

that logarithmic functional form is more appropriate, which supports earlier findings by Khan and Ross (1977). Omojimite and Akpokodje (2010) found that exchange rate reforms in Nigeria accounted for a marginal improvement in the country's trade balance. As against the view that exchange rate reforms discourage the importation of consumer goods, their findings show that during the reforms, the importation of raw materials and capital goods did exceed the pre-reform era.

Among the Nigerian studies, all but Egwaikhide (1999) and Aliyu (2001) carried out aggregated estimations of Nigeria's aggregate import demand function. These in each case culminated into a cointegration and error correction mechanism, suggesting a cointegrating relationship between imports and their determinants. The outcome of this shows that certain variables such as, real income, real exchange rates among other factors determine Nigeria's level of import demand. This study intends to investigate further the extent to which these findings are in conformity with events in the non-oil sector. This will provide a measure of confidence to solving the trade deficits problem of the sector.

4. Methodology

4.1 Theoretical Framework

The useful theoretical framework for the analysis of non-oil import demand function is the simple import demand model (Khan, 1974). This import demand model as developed by Khan, has also been employed in some other studies like Nurusimhan and Pritchett (1993) and Thirlwall (1999). It was modified and used by Yekini (1999), Aliyu (2001), Okoh (2002) and Aliyu (2007). It involves the use of cointegration and possible error correction modeling, using Ordinary Least Squares (OLS) regression technique, predicated on the simple linear relationship between import as dependent variable and its theoretical determinants as explanatory variables.

4.2 Analytical Framework

Several models were employed by different authors in the line of study. However, the model that is more appropriate for what the study intends to do in this investigation and upon which analysis herein will be based is the model adopted by Aliyu (2007). The paper employed the simple import demand model as developed by Khan (1974). This culminated in a cointegration and error correction modeling, using the Ordinary Least Squares regression (OLS) estimation technique, which was predicated on the simple linear relationship between exports-imports as dependent variables and exchange rate, income, imports capacity, level of foreign reserves, degree of openness and SAP policy etc as independent variables; and found, among others, that exchange rate significantly affects imports more than exports (i.e oil and non-oil). Index of openness in the imports model stimulates more imports while other factors not included in the model but

captured by the error correction mechanism in imports model exert negative influence on imports on the long run.

The development in the literature (in the area of econometric modeling in particular) gives us the flexibility of choosing our own functional specification, as Learner and Stern (1970) noted that there are no well defined criterion for choosing a particular functional relationship/specification. Rather it is the researcher who decides what functional form to use (influenced by the theoretical position chosen), provided the choice is not harmful to the results obtained. Thursby and Thursby (1984), as cited in Aliyu (2007), further discover that logarithmic functional form is more appropriate. Reasons for the appropriateness of logarithmic functional form are for the purpose of linearizing the model, so that it can be estimable using OLS regression technique. Secondly, given that the coefficients to be estimated are elasticities, logarithmic functional form enables one to measure the percentage change in the dependent variable, for a given percentage change in the independent variables.

4.2.1 Model Specification

Following Aliyu (2007), the model will specify a linear relationship between non-oil imports (NOM) as dependent variable, and Real Income (RGDP), Real Exchange-Rate (REXG), Level of Foreign Reserve (FRV), Index of Openness (IOP), Import Capacity (IMC) and a dummy variable (for SAP policy period, (DSAP)).

The functional non-oil import demand can be specified as;

$$NOM = f(RGDP, REXG, FRV, IOP, IMC, DSAP) \quad (1)$$

Where: NOM = Non-Oil Import, RGDP = Real Gross Domestic Product, REXG = Real Exchange Rate, FRV = Level of Foreign Reserve, IOP = Index of Openness, IMC = Level of Import Capacity, DSAP = Dummy Variable for SAP Policy Period and f = functional symbol.

When estimating parameters are introduced and a random term "U" to take care of variables not included in the model but affect non-oil imports, equation (1) transforms to:

$$NOM = \beta_o + \beta_1 RGDP + \beta_2 REXG + \beta_3 FRV + \beta_4 IOP + \beta_5 IMC + \beta_6 DSAP + U \quad (2)$$

The dynamic model of equation (2) after expressing the same in log-linear form as supported by Thursby and Thursby (1984) is specified as;

$$|_n NOM_t = \beta_0 + \beta_1|_n RGDP_t + \beta_2|_n REXG_t + \beta_3|_n FRV_t + \beta_4|_n IOP_t + \beta_5|_n IMC_t + \beta_6|_n DSAP_t + U_t \quad (3)$$

β_1, β_2, β_3, β_4, β_5, and β_6, are the elasticities of Real Income, Real Exchange Rate, Foreign Reserve, Index of Openness, Import Capacity, dummy variables-for SAP policy period. The a priori expectation is that β_1, β_3, β_4, $\beta_5 > 0$. While β_2 is expected to be less than zero. The dummy variables for SAP is intended to capture the period before and after the introduction of the Structural Adjustment Programme in Nigeria. It will be assigned binary 0, and 1; 1, for post SAP and 0, for pre SAP eras. Its coefficient is expected to assume a value greater or less than zero.

4.2.2 Cointegration and Error Correction Model

Cointegration becomes an overriding requirement for any economic model using non-stationary time series data. If the variables do not cointegrate, then we have the problem of spurious regression and econometric work becomes almost meaningless. On the other hand, if the stochastic trends do cancel, then we have cointegration which will then necessitate an error correction model (ECM). The ECM has the advantage of including both long-run and short-run information of the model.

In the event of a long run relationship among the variables, equation (3) transforms into an error correction model specified as:

$$\Delta|_n N0M_t = \beta_0 + \beta_1 \Delta|_n RGDP_t + \beta_2 \Delta|_n REXG_t + \beta_3 \Delta|_n FRV_t + \beta_4 \Delta|_n IOP_t + \beta_5 \Delta|_n IMC_t + \beta_6 \Delta DSAP_t + \lambda ECM_{t-1} + V_t \quad (4)$$

Where:

$$ECM = (\Delta|_n N\text{-}0M_t - \beta_0 - \beta_1 \Delta|_n RGDP_t - \beta_2 \Delta|_n REXG_t - \beta_3 \Delta|_n FRV_t - \beta_4 \Delta|_n IOP_t - \beta_5 \Delta|_n IMC_t - \beta_6 \Delta DSAP_t)_{t-1}$$

λ = Adjustment parameter which shows the extent to which the disequilibrium in the dependent variable (Δ |n$N0M_t$) is being corrected each period.

Δ = first deference operator

$V_t = \Delta U_t = (U_t - U_{t-1})$

Either equation (3) (if there is no long run relationship among the variables) or (4) (in the event of a long run relationship among the variables) shall be estimated.

Thus, our first objective shall be captured by the respective test of significance on each explanatory variable. By evaluating the signs and magnitude of the elasticities, the second objective will be captured.

4.3 Estimation Procedures

The Ordinary Least Square (OLS) will be employed in estimation of the model, being the best linear, unbiased estimator. This is after making sure that the variables in their behaviours conform to the assumptions of the classical regression model. Effort will

be made to ensure that the model adheres to the principles of parsimony using AIC (Akaike Information Criterion) and SBC (Swartz Bayersian Criterion). A unit root test will be conducted using Augmented-Dickey-Fuller (ADF) and/or Phillips Perron (PP) to examine the time series properties of the model. The level or order of integration of the residual error term of a set of non stationary time series aggregate should be zero (that is, $U_t \sim I(0)$) in order to qualify as an error correction model. Furthermore, a stability test will be conducted to test for the stability of the model across samples within the period using recursive residual and cusum tests.

4.4 Data Sources and Transformation Processes

Annual data had been widely used in previous studies. So far, the study has no justifiable reason to deviate from this existing practice; economic variables respond to policy changes after a lag of time, hence the use of annual data will be employed here. However, some data for the variables of interest will need transformation. Explained below are sources of these data and mechanisms for the expected transformations on some of them:

1. NOM (Non-Oil Import), RGDP (Real Gross Domestic Product), REXG (Real Exchange Rate), FRV (Level of Foreign Reserve): Annual data on each of these variables are published by CBN in the statistical bulletin.
2. IOP (Index of Openness): This is said to be synonymous with the idea of neutrality in the trade policy. This is measured as a ratio of the sum of non-oil export and import to RGDP. Thus (NOX + NOM)/RGDP. Where NOX = Non-Oil Export, NOM = Non-Oil Import, RGDP = Real Gross Domestic Product.
3. IMC (Import Capacity): This is the foreign exchange component of the model to be employed, which represents the capacity the economy has to import. It is measured as the ratio of annual average reserve to annual import.

   Thus, $IMC = \dfrac{\text{Annual Reserve Average}}{\text{Annual Non - Oil Import}}$

   Given that a part of RGDP is included in the norminator (annual reserve average); some degree of multicollinearity is expected. The study however chose to accommodate this rather than drop the variable (IMC); dropping it will lead to misspecification of the model.
4. REXG (Real Exchange Rate): Processed data on this will be sourced from the African Institute for Applied Economics (AIAE) Enugu.

E-VIEW Econometrics software shall be used to estimate the model and evaluation of the results; Ms-Excel 2003 will be used for data entry.

5. Empirical Analysis of Results

This section presents the results of various tests that were conducted, and the analysis that follows from the results of the stationarity tests on the various macro data for the study. The ADF test outcome which was substantiated by the Phillips-Perron test outcome, establishes stationarity in all the series (some at level form, and others after first differencing). A confirmatory test for the suspected absence of a long run relationship between the dependent variable and the regressors was conducted on the residual term as presented in table (II). This yielded residuals that are non-stationary at level form. The implication of this finding is the absence of a long run relationship between the dependent variable and the independent variables, and the fact that analysis herein can and will be based on model (3).

Table (III) presents the results of the regression model as specified in equation (3). The results show that only three out of the six coefficients are statistically significant at 5% as well as 10% levels of significance. Four of these variables have the theoretically expected signs, while the other two (exchange rate and import capacity) have not. The coefficient of multiple determination (i.e. adjusted R^2) of 0.97 indicates a very strong explanatory power of the model, i.e. changes in the dependent variable (non-oil import demand) can actually be accounted for by the independent variables. The result of the F-statistic shows that independent variables are non-zero at 95% level of confidence. This leads to the rejection of the null hypothesis that the coefficients have zero value. There is some degree of positive autocorrelation in the model as judged by the D. Watson statistics. This is however not unconnected with the quality of data used.

The result of the white hetroscedasticity test as presented in table (IV) failed to reject the hypothesis of no hetroscedasticity in the data. The conclusion drawn from this is that the homoscedasticity assumption of CNLRM has not been violated; so the variances are constant over time. From the correlation matrix the pair-wise correlation between IOP and FRV variables is high, suggesting that there may likely be collinearity between the variables. However, the study chose not to drop any of these variables from the model to alleviate the problem, because that may lead to specification bias, which has its own consequences. The remedy here may be worse than the disease itself. A collinearity problem, even when severe, is essentially a data deficiency problem and we have no choice over the data in use herein being secondary data. As a result the best option to get around this, which is really not a problem, according to Blanchard (1967), is not to resort to creative techniques, but instead "do nothing". Hence, a collinearity problem, even when severe, is essentially a sample phenomenon which violates no regression assumption. It is not a serious problem when it comes to prediction (see Gujarati and Sangeetha, 2007). The Jaique-Bera (JB) test of normality rejects the hypothesis that the residuals are normally distributed. From the results, JB statistics = 18.65199, and the P value of obtaining such a high value is 0.000089 (see

figure (II)). This is not unconnected with the sample size for the study (the JB test of normality is an asymptotic test). It is however not specified in the literature what constitutes a large sample for this test (see also Gujarati and Sangeetha, 2007).

5.1 Stability Tests

Employing the recursive residual test to examine the stability of the model across samples within the period under review. The results show that the recursive residual of 1992 and 1995 although within the ±2 s.e band, moved towards the lower band. Generally however, the model yields a stable result. The cumulative sum of residual (CUSUM) test yields a better result, as there is no apparent case of the statistics tending toward the critical lines of 5% level of significance.

The result of the CUSUM of squares test statistics shows that the residual plot went beyond the critical lines between 1997 to 2002, but remained within the band in other periods. The conclusion drawn from these tests of stability indicates that the model is stable within the study period, therefore estimates from it can be reliably used to analyse and predict the non-oil import demand in Nigeria. (see figures II, IV and V).

5.2 Discussion of Results

From the study, it was discovered that a unit change in the level of foreign reserve is expected to induce changes in non-oil imports by 99 percent, in the same direction, which is not surprising given the strong positive link among revenue from oil, the level of foreign reserve and imports generally in Nigeria.

Another finding from the result is the fact that non-oil imports decrease by 99 percent, for every percentage increase in the level of import capacity–which is somehow ambiguous. The result outcome is however not unconnected with the inseparability of some of the data that were used. In the study we have no choice but to make use of the data in the form that they were made available. Originally, a major objective in the study was to net-out the influence of oil receipts. This study could not completely achieve this, given that the annual reserve average, which is a component of level of import capacity, has oil receipts as a dominating unspecified component-hence the ambiguous result obtained. This ambiguity will always have itself corrected whenever the study is undertaken on a wider aggregate (i.e. oil and non-oil trade), as has been observed in some of the previous studies (see Egwaikhide, 1999; Aliyu, 2007 etc.).

Furthermore, the findings revealed a relatively negligible effect of openness of the Nigerian economy, on non-oil imports; non-oil imports increase by 4 percent for every percent increase in the degree of openness and vice-versa. The implication of this outcome is the fact that, though non-oil imports are affected by openness of the economy, however, openness should not be a major concern when it comes to regulating the level of non-oil imports in Nigeria. A critical examination of this particular result leads one into admitting again the influence of oil receipts as a result of the inseparability of the variable (RGDP), used in the computation of IOP into oil and non-oil real GDP.

A summary of these outcomes is the fact that Nigeria's non-oil imports are not stimulated by changes in real income, real exchange rate and SAP policy, but rather stimulated by changes in the level of foreign reserve, degree of openness and level of import capacity.

6. Conclusions and Recommendations

6.1 Conclusions

The paper undertook a detailed review of theoretical and empirical literature, which led the authors to agree with Aliyu (2007) that there is no consensus on the specific factors affecting import demand models generally, as most applications of these models to different countries adopted a similar approach, which is Ordinary Least Squares (OLS) in either static or dynamic form. This paper further discovered that most Nigerian studies employed the (OLS) in dynamic form, suggesting the existence of a long run relationship among the variables in Nigerian data. However, it is of note that these studies included oil imports in their models.

The results of the stationarity test using the Augmented Dickey Fuller and Phillips-Perron test show that all the series are either stationary at level form or first difference. The result of the cointegration test substantiated this suspected absence of a long run relationship between the dependent and independent variables. Given this results outcome, the paper hence adopted OLS estimation technique in static form in analysis herein.

From the empirical estimation of the static model it was established that while the coefficients of the level of foreign reserve, import capacity - which is the foreign exchange component of the model - and degree of openness are statistically significant, those of real income, real exchange rate and SAP policy were statistically not significant. The economic implication of this is the fact that Nigeria's level of foreign reserves, import capacity and degree of openness are very vital for regulating the level of non-oil imports in Nigeria. Hence import restrictions, reduction in the level of foreign reserves, as well as increases in the level of import capacity are required to reduce the level of non-oil imports in Nigeria. The reverse of these measures will achieve the opposite result.

Specifically:

- There is a positive theoretical link between revenue from oil, level of foreign reserve and non-oil import demand in Nigeria.
- While the level of foreign reserve and degree of openness positively stimulates non-oil import, the level of import capacity negatively affects it.
- Real income and real exchange rate do not have a significant impact on non-oil import demand in Nigeria. This failed to support findings from previous Nigerian studies like those by Ajayi (1975), Egwaikhide (1999), Aliyu (2001) and Aliyu (2007). This revelation is however surprising given the role of both variables in international trade. This finding supports the expected effect of psychological factors (consumption habits) in particular, on the level of non-oil imports in Nigeria.

6.2 Recommendations

Based on the findings above, this paper make the following recommendations as ways of fostering a favourable foreign trade, and enhancement of Balance of Payments (BOP) equilibrium in Nigeria.

- Rather than channel Nigeria's oil revenue to importation of consumables, most of which can be produced domestically, effort should be geared towards efficient and judicious utilization of these oil receipts in the provision and maintenance of the nation's infrastructures, and creating the required enabling environment for an efficient private sector driven economy.
- Given that the degree of openness stimulates non-oil imports, and the fact that Nigeria's non-oil export sector is yet to develop as to be able to generate enough export receipts to balance her import bills, there is need to apply caution in the drive to join the league of globalized economies. Since openness is inevitable in today's global system, sequencing of phases of liberalization as an instrument of openness is highly desirable.
- Policy and programmes with the ability and capacity to redirect the attitude of Nigerians towards products made in Nigeria should be adopted and tenaciously implemented. This should be complemented with expenditure switching measures as ways of stimulating consumption of home made products; Aliyu (2007) establishes the fulfillment of the Marshall-Lerner condition in Nigeria.
- Import restriction policies should be adopted: This is necessary on one hand, given that imports performed poorly during the period of control, compared with the liberalization period. Secondly, given the high percentage of the nation's reserve that goes into non-oil import expenditures, restrictions in the mode of high import duties on some categories of light manufactures is necessary to reduce the already high expenditures on non-oil imports, and depress the already stimulated taste of Nigerians for foreign light manufactures that can be produced domestically. Again this will give protection to domestic firms, who will be expected to produce to meet domestic demand given improvements in the level of infrastructural development.

Table I. Augmented Dickey-Fuller and Phillip-Perron Stationarity Tests

Variables	Slope	t-stat.	Critical value	DW	Slope	t-stat	Critical value	DW
LnNOM	-0.63	5.25	-1.95	1.89	0.15	8.25	-1.95	2.37
LnRGDP	0.01	3.03	-1.95	2.00	0.06	4.16	-1.95	1.98
LnREXG**	0.23	-5.76	-1.95	2.05	-0.94	-5.76	-1.95	1.98
LnFRV**	0.01	-2.88	-1.95	1.80	-.0.50	-3.35	-1.95	1.80
LnIOP	-0.5	3.39	-1.95	1.96	0.07	3.40	-1.95	2.67
LnIMC**	0.29	-5.79	-1.95	2.07	-1.07	-6.74	-1.95	2.03
DSAP**	0.00	-4.18	-1.95	2.00	-1.00	-6.08	-1.95	2.00

Source: Authors computation from data from regression result and test of stationarity,
*Note: ** Indicates variables that are stationary after first differencing.*

Table II. Results of cointegration

Equations	Coefficient	t-statistic	Critical value
Equation 4.8	-0.37	-2.13	-2.94

Source: Authors computation from cointegration test result.

The Regression Model

Table III. Regression results of non-oil import demand

Dependent variable	Independent variables/Constant	Coefficient	t-values	Other statistics
LnNOM	C	-0.004	-0.559	R^2 0.98
	LnRGDP	0.009	1.754	Adj R^2 0.97
	LnREXG	9.410	0.109	F-stat 20533383
	LnFRV	0.991*	205.721	D.W 2.469
	LnIOP	0.039*	7.965	
	LnIMC	-0.991*	-206.988	
	DSAP	-0.001	-0.395	

Source: Authors computation from regression results
Note: * indicates significance at 5% level

Other second order tests

Table IV. White hetroscedasticity Test

No of observation	$R^2_{auxiliary}$	df	$n.R^2_{auxiliary}$	$X^2_{0.05}(k)$
40	0.638270	28	17.87156	41.3372

Source: Authors computation from test statistics and chi-table analysis.

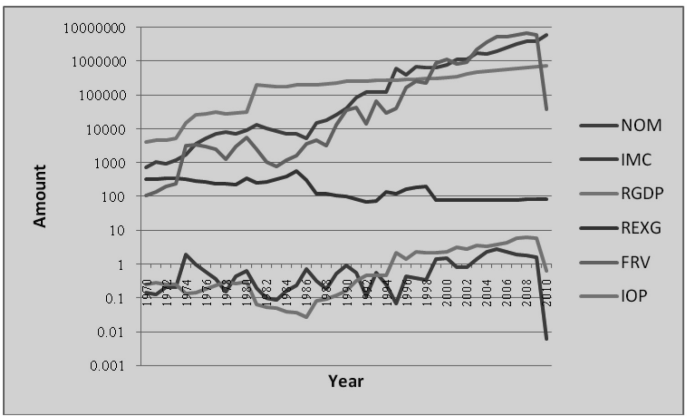

Figure I. Trends of variables and Non-oil Import Responces

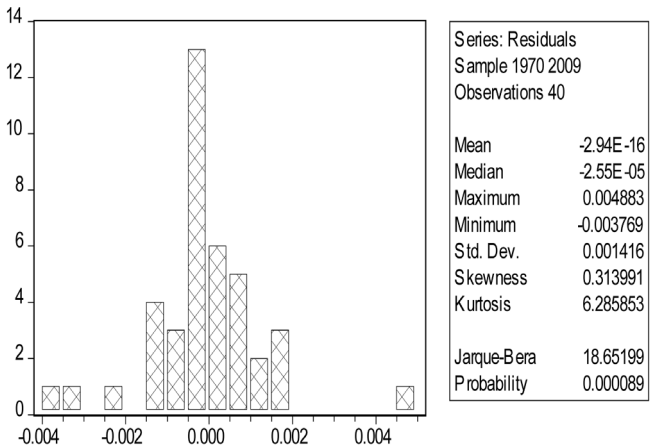

Figure II

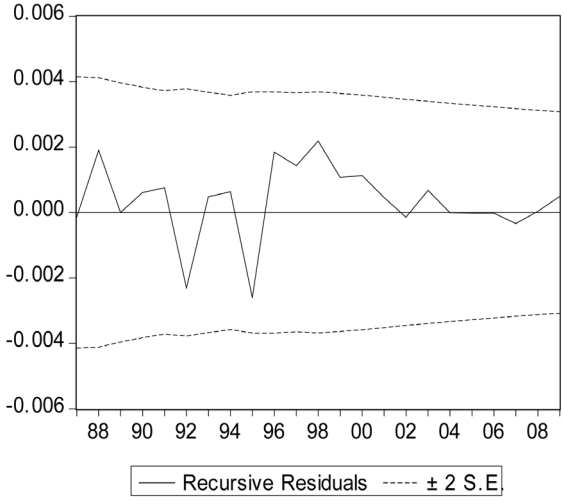

Figure III

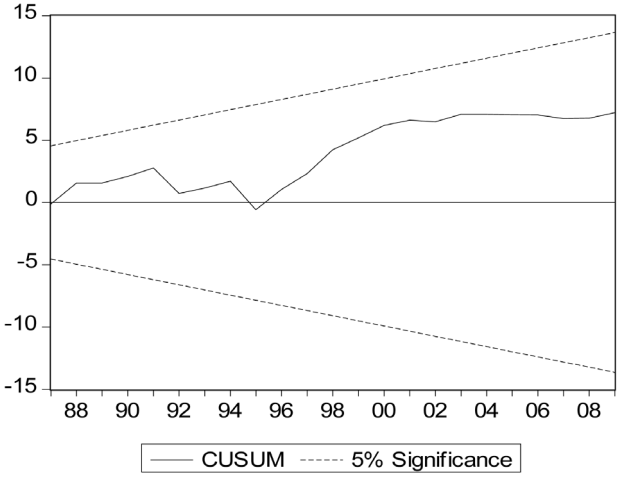

Figure IV

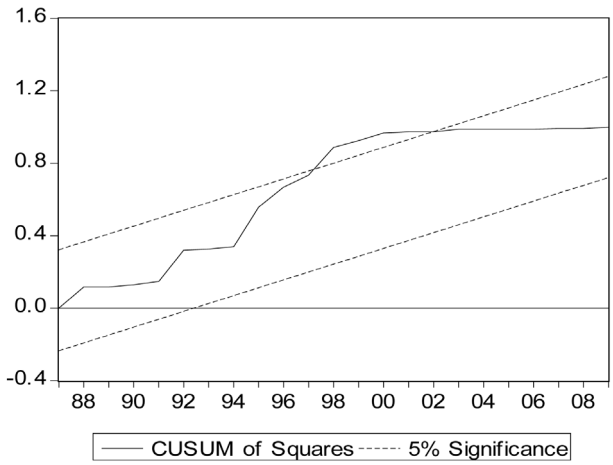

Figure V

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Book Review

Rediscovering Sustainability. Economics of the Finite Earth

edited by A.R.G. Heesterman and W. H. Heesterman
Published by Gower Publishing Ltd, Surrey England, 2013 pp. 326

reviewed by Theodore P. Lianos*

According to the authors, this book "covers both environmental and economic issues. Unsurprisingly, the main emphasis of the book on the environmental side concerns climate change. The consequences are well documented. By the end of summer 2011 the arctic sea ice was melting twice as fast as in 1972. Climate change is already affecting the health of children in the developing world, in particular, and putting the future of coming generations into jeopardy. However, the authors stress that humanity's onslaught on the earth is much wider. Biodiversity is at serious risk from profit-oriented production methods and current patterns of consumption".

This opening paragraph of the Introduction gives the general tenor of this very interesting book. A second central theme is the authors' valid idea that the existing price structure is false, in the sense that prices do not accurately represent the real costs of production because some real costs are not captured by the methods used.

The book is organized in three parts, with the first covering "Stylized Market Equilibrium", the second part "The Real Market Economy" and the third the problem of "Present Affluence Versus the Future".

It covers a great variety of important issues, which makes it very useful for teachers and students as well as for activists who need relevant and solid arguments.

One aspect of the book that may deter some readers is that it oscillates between being a textbook and a treatise. Thus it does not have the simplicity and clarity of a textbook, or the tightness and the depth of a treatise.

There are two important issues that I believe should have received attention in a book like this one and which the authors do not discuss adequately. The first has to do with the structure of tastes and the lifestyles of the wealthy segments of rich societies, which result in the wasting of limited resources. The second issue is more important and has to do with the huge problem of overpopulation. Although the problem of

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climate change can be analyzed without reference to the size of population, there is no doubt that the ultimate causes of the destruction of the environment are the shamefully luxurious lifestyles of the rich and overpopulation.

There are researchers who argue convincingly that the maximum sustainable population size is less than half of the present size of 7.1 billion people. Thus whatever changes take place in the way we price resources so that the real costs are properly included, sustainability will only be wishful thinking with seven or more billion people demanding limited resources for their basic needs.

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