ARCHIVES OF ECONOMIC HISTORY

Volume XXIX No 1 January – June 2017

ΑΡΧΕΙΟΝ ΟΙΚΟΝΟΜΙΚΗΣ ΙΣΤΟΡΙΑΣ

Τόμος XXIX Τεύχος 1 Ιανουάριος – Ιούνιος 2017

CONTENTS - ΠΕΡΙΕΧΟΜΕΝΑ

G. SKOULAS – J. SKOULAS: Globalization and Economic Crisis: Implications on the National Sovereignty 5

A. ZOIS – S. ZOI: The Price of Rhodium in the International Market Between 1985 and 2013 and the Impact of Non Economic Factors 27

J. A. PARAVANTIS – N. KONTOULIS: A Geopolitical Approach to Conceptualizing and Measuring Energy Security 41

G. G. KAKALETRI: Employees' Behavior in the Greek Mutual Fund Industry 69

ATHENS - ΑΘΗΝΑΙ, 2017

ARCHIVES OF ECONOMIC HISTORY

84, Galatsiou Avenue, Athens – 111 46, Greece, tel. +30 210 2934916 / +30 6937 244739
e-mail: akiohos@otenet.gr

GLOBALIZATION AND ECONOMIC CRISIS: IMPLICATIONS ON THE NATIONAL SOVEREIGNTY

G. SKOULAS* J. SKOULAS**

Abstract

An examination is made in this article, regarding the phenomenon of globalization which has preoccupied many researchers and specialist writers during the past thirty years, with very different and opposing considerations or positions. The one group, or trend, sees the phenomenon positive with the liberty of the markets, certainly if we compare it with the previous function of the bourgeois nation state which it could be unthinkable. While the other, considers it negative because it appears the many to be absent from this action and thus the only benefited group is the very few who participate. For this reason, the focus of our efforts tends to carefully examine and define the economic aspect of globalization in order to understand and the other aspects such as social, political and cultural. The anticipated target of the article, is focused on to approach this with a penetration as possible in order to make a clear diagnosis of what we see if it is the image of reality as it actually is, or it is the image of an inverted world imposed on us as the right side. So, is this a myth which essentially has been transmitted as a historical social truth or not?

JEL Classification: B20, F01, F60

Keywords: globalization, neo-liberalism, free market, crisis, nation state, downward diffusion.

1. Introduction

During the last three decades or more, they have been spoken and written several reports and analyzes for globalization with very different and opposing views or positions. Some of them are seeing this economic phenomenon positively because it occurs in the global community, with the liberty of the markets, which could be unthinkable in the previous function of the state. While, others considering it negative because they think the phenomenon creates huge inequalities. Mainly because the many are absent from this activity and the only benefited ones are the few who participate in it. That is, the many as the mass working population lack such participation while the various capitals

* Professor, Department of International and European Studies, Address: 4 Himarras Street, Pylaia, P. C. 55535, Thessaloniki, Greece, Tel.: +302314312992, e-mail: gskoulas@uom.edu.gr.

** PhD Candidate, Department of Business Administration, University of Macedonia, e-mail: jskoulas@uom.edu.gr.

possessed by few, as the one factor of production, has been facilitated to cross the national borders without obstructions. But, the question here is, are things exactly as described by these two opposing positions? It seems to those who see it with the negative view, that it has been manifested a strict exclusion of those who despite being the key factor of production are not involved in such a function of the production process, which however, takes huge dimensions in the global economy.

For this reason, in our attempt to define the economic fold of globalization in order to comprehend also the other aspects such as: social, political and cultural, our anticipated goal is the following. To approach this as deeply we can for diagnosing that which we see if it is the real picture of reality as it actually is, or it is the image of an inverted world imposed on us as the correct side. That means, as a myth substantially which has been transmitted as a historical social truth[1].

2. Different Approach Methods to Globalization

It is known by now that we live in a period that is characterized as the epoch of spec table, of speed and of the internet. It is therefore increasingly accepted that we are living in a period which the social life, for its most part, determined by global processes not necessarily by purely national issues, either in culture and education, or in economy. That is, it is not in doubt the fact that the late capitalism as a social formation, is suffering a great alteration internationally which it has been identified as "globalization". But, there are many different conceptions on how they comprehend this globalization, where we will simply record here the main ambivalent positions. For example, today is clearly elevated that one real international economy has already emerged, where the respective ethnic economies and the strategies of the economic national governance are becoming constantly weaker. But, is this really so? Or there is some other position which is spherically more detailed and scientifically more correct?

As the term globalization refers, for many, in the doubtless dominance of the free market pursuing one purchase space with a complete freedom from any coercion. In other words, it is liberating itself from the dependence to any imposition or even undermining the concept of the free nature of function of the market. That is, it connotes a market which could not but being governed by the supply and demand mechanisms and only by them, if it wants to be safeguarded the free competition in its operation. However, the globalization is indicating a fundamental role of competition, the liberty of the global markets and the market of labor in the international context, as well as reducing

also the importance of economic borders of the nation-state. That means, a new form of competition in contrast to that which has been professed by the classical sense of competition, being that of liberalism. While, the real sense of classical liberalism had restricted the economic activities within the walls, for example, within the national borders of the state, for obvious reasons of the national economy, of each nation-state. That is, what liberalism restricted by barriers and customs duties to other states, the globalization releases by opening these borders wide open[2].

According to Kotzias N. there are three ways to characterize the globalization: a) First, as a process or a result of global dimension. b) Second, as a worldwide trend which can maintain the primary or secondary position. And third, c) as an isolated phenomenon or a set of phenomena which is recorded or have being recorded on a global scale. But with reference to the international debate, it is stated that the globalization is focused more on the economy of the market[3]. According to Hirst and Thomson, "the global economy has been internationalized in its core dynamic, it is dominated by uncontrolled market forces and it has major economic factors and important agents of change genuinely transnational corporations, which are not subordinated to any nation state and they are consolidated anywhere that it has been dictated to them the advantage of the global market[4]". But, is it really this situation and not another?

Many wonder about this, where among them are also the above authors and so they conclude in the following: **Firstly,** they consider the engaged largely internationalized economy is not unprecedented. "It indicated to be one of those conditions of the international economy such as the one which was based on the developments of modern technology in the industry that became generalized from the sixth decade of the 19th century". Specifically it happened from 1860 and 1870, culminating in the second industrial revolution during the decade of 1890 that was marked scientific. **Secondly,** the truly transnational corporations seem to be relatively few. Most companies have a national basis while its commercial activity is exercised on a multinational level. **Thirdly**, the mobility of capital does not produce massive transposition of investment and employment from the developed countries to developing ones as known until yesterday as the third world. That means, these developing countries are maintained at marginal levels. Contrary to that, foreign direct investment demonstrates a high degree of concentration in the advanced industrialized economies, which leaves the developing world aside and forgotten in reference to investments and trade. **Fourth,** it is recognized generally so far from the extreme supporters of globalization that the world economy is far from being truly global. Mainly because the trade, investment and financial flows,

ultimately accumulated in three main areas, as poles of attraction: in Europe, Japan and North America.

In a sense, this could not be called global economy when all the economic activities are centralized in some countries of the world while the rest of it is not only uninvolved but also neglected. **Fifth**, the above three great powers have clearly the ability, especially when they are coordinated politically in order to exercise pressure on the global markets and create simultaneously other economic tensions. The global markets do not seem to be in a complete liberty and without inspection, even if the space of action and the objectives are limited by the diverging interests of big forces[5]. In other words, the supporters of these conceptions could not see the entire economic independence and liberation to all areas. From another aspect which can be classified as an official view that has been expressed by the supporters and proponents of globalization such as the World Bank, the WTO and the IMF, tend to identify it as "the growing economic interdependence of the countries in the world scale through the evolving in size growth and the variety of the cross-border transactions. To add here also, the international capital flows, as well as, through the increasingly more rapid and widespread diffusion of technologies[6]".

In other words, here is pointed it out the great significance of the phenomenon which its development will cause fundamental changes that will be beneficial in the form of the modern world. Some of the most ardent supporters of this perception take a step further to argue that in this century we live in there will be no national products, national technologies, or national companies, but in a sense not even national economies in the form it was until today. However, why this is happening would someone ask? Well it is self evident simply that since each factor of production is crossing national borders unhindered the concept of the national economy loses its essential meaning[7]. But is it about all factors of the production process will ask others? Because usually for being the production completed, contribute two main factors: a) capital, and b) labor. These are the two fundamental productive forces. To what extent the second factor of production can crosses national borders unhindered?

Let's look briefly below about the above notion as a process in what is consisted of and to what aim? First, to the globalization of financial flows and the protection of the capital property resulted from the liberalization of global markets. That is, to the deregulation of financial markets, the internationalization of the mobility of capital and to the increase commercial mergers[8]. Second, to the globalization of markets and the investment strategies which simply mean the process of integration of business practices in the global level and the widespread enactment of the world economic functions? Third, to the

globalization of technology as an evolution that is due to the development of informatics and the particular functions of the internet.

This means that the potentialities are large with respect of the horizontal and vertical electronic interconnection between different business sectors that are not located in the same areas. This therefore results in the organization of production on a global dimension and the speedy transfer of information, improvement of technological support systems of the financial system for its rapid development. Fourth, to the expansion and development of activities and the overall strength of transnational companies, aimed at increasing their profitability rate by transferring their investments easily anywhere they consider right place. And fifth, to the continued expansion of international trade in goods and services as well as to the removal of skilled labor.

3. Review of Schools of Thought & the Concept of Judgment

From the above gathered, that the globalization elevates the opening of the gates to the other nation-states, the "great importance of the international financial markets and the significant role of the free passage of capitals"[9]. The result of such an exposure is one global economy without borders, but it seems to not even have principles regarding with the overall organization and directions, that means unregulated, and so it is refrained from the integration of this global function since the triangle Europe, Japan and North America affecting economic activities and operations. The term globalization therefore implies the openness character of the international economy but without an organized world economy with principles and rules in its function. The strong supporters of the neoliberal approach are quite positive towards the globalization because they think that the results of its operation are beneficial for all social strata and for the environment[10].

For such positive results, the reasons are mainly that the globalization "supposedly allows the development of healthy competition and thus it leads to the improvement of the effectiveness and the propagation not only of knowledge, but also of the goods of development, through what we call the phenomenon of the down diffusion[11]". But, the question that arises here and results in a sonorous and correct answer is how could really exist a healthy competition in the economy when there is no equally sized businesses? Other theories "draw our attention mainly in the importance of national governments and national economies in the global economy[12]". It seems however, that they are either deluding themselves or they are in contradiction, when they are giving an interpretation of the constant intervention of the ethnic state in the economy

despite the apparent triumph of neo-liberalism mainly in the last two decades and the growing trend of globalization.

So, as more open the markets become, the greater seems to be the degree of accumulation of wealth in much a fewer hands, but the nation-state results at the end weaker for interventions. Consequently, with a weak state to interventions not only the working population is left without protection, but the market is also in anarchy. Nevertheless, whatever intervention of the state might be today in contrast with the classical era of liberalism, it wouldn't guarantee a positive outcome for labor because the state itself is a part of monopoly capital with its various shares and public state enterprises. In other words, since the state itself is a product of the bourgeois society it couldn't be but a class-divided state and since this same state has its own capitalist companies it is identified with the interests of the dominant classes and not with the dominated classes which are the world of labor. But one question here can hardly be answered since it is not known the orientation and the objectives of the nation-state, in reference with how the development arranged into the national borders when it presents a state problem. In such a case, the WB and the IMF have central mixture. The first designated to governments the model of multilateral lawn development, in the epoch of the Breton Woods agreement that was elevating its own activity as well as the activity of a set of regional development banks for the developing world in Latin America, Africa and Asia.

While the second, the international monetary system IMS, focused its attention on the supply of assistance which was relating to the liquidity of the crises above all of the balance of payments and the stability of the political system[13]. But this role according to the researchers has already undermined, especially after the problematic state of shock from the "petrodollar" in the decade of 1970. The role of the World Bank however had also changed, as it is reported by the same authors, after the period of debt crisis, while the significance of the commercial banks was strengthened for financing the debt of the developing world. The new sectors and roles these organizations invited to play mainly after 1989, they have accepted with a zealous both the WB as well as the International Monetary Fund for the development of their advisory activity[14]. But what is the position of these organizations and to what degree they can solve financial problems by the lending and arrangement of crises when they cause so many other social and political within the nation-state, is a key issue on the negative aspects of globalization. The ultimate goal of these organizations is not to enhance the economy of the indebted state without this same state paying the marble expensive, but to make sure that the capitalist system will not collapse.

In the contemporary economic system is observed that the countries and the

companies base to a great extent their survival and their future, in the ability to finance their needs with borrowed funds. This is done, through issuing bonds which is a debt confession of the borrower to the lender. The credit rating agencies have created a scoring system of the bonds issued by states and companies, which is directly and decisively with the stock market debt trading and provision of loan capitals with a relationship very simple: the better the rating, the lower the borrowing cost. In other words, the worse the credit rating is the higher the borrowing cost gets. If, for any reason, credit rating agencies decide to grade with an excellent mark bonds of a State, a company etc. then, regardless of their actual economic situation, they could have access to the borrowed funds with very low cost and so they would have always the possibility to survive but the opportunity and the time to engage in any structural activities needed to make healthy by improving problem areas. Conversely, if the credit rating becomes strongly negative, then the tap of financing closes, causing economic suffocation even to the most powerful state or the healthiest company.

4. The Role of International Organizations, World Economy, Policy and Nation State

What is attempted here is mainly to highlight how it appears the inverted image of the modern economy internationally and the arguments they have, the positions they express and the ideas they screen by the proponents of the conception of globalization for further confusion. The fact that the kind of the economy which is illustrated by some scholars and representatives of the international organizations as those who they are the inventors of theory of the globalization is elevated here as an ideal form of international economy[15]. But, are things so, or they are far away from reality? What actually they say is that if we look at the economic system on the global level the thing we see is that separated national economies are integrated and restructured in the capitalist system by the international processes and transactions. The international economy instead, is the one in which the procedures of the nation-state continue to function as the total procedures that are determined at an ethnic level, consequently the global phenomena appear as the outcome of the distinct and different attribution of the national economies[16]. In other words, the global economy is the total ethnic pre-determined functions. Thus, while under such an economy there exists a great and an increasable facet of international economic interactions such as the trade and the markets, they tend however to function as constraints for the national economic factors and their regulators.

The supporters of globalization tend to put aside these restrictions. So they

consider that the global economy thrusts these nationally based interactions even more, where in such a way and since the markets and production become substantially global, the international economic system becomes autonomous and transforms its special social determination. This very autonomy refers to the freedom of action at the moment which it should be there certainly a political or regulatory control. The policies of the public and private companies in each nation state will necessarily have to take account of such international economic factors that have an international scope of action. That is, the interdependence existed in the system itself globally not only is increased but it is also transformed. The problem that arises here for the public authorities is to how they will carve or inscribe their indispensable policies at the national level in order to effectively confront the emerging systemic interdependence between the economic agents. The great difficulty that can occur is on the configuration mode of effective patterns of national and international public policy for confronting the forces of the market. Regarding these policies there exists an ongoing juxtaposition between two basically different strategies among ardent supporters of globalization on the one side and those who are against it on the other. The first one supports the efficacy of the free markets and the corporate control over public services, which is the neoliberal recipe where it seems one international order of things rational[17]. Others however will wonder who is ultimately benefited from such a state of affairs when there is not equal treatment with the factor of capital the factor of labor and when the activity of the markets is not politically controlled?

The great financial crisis of 2007 and the subsequent recession, which while it began in the USA, proved to have serious implications around the world confirming the international economic interdependence, which it strongly emphasized the need for international cooperation and raised again the debate about a global economic policy. The new challenges are growing more and more and they are intensified requiring eventually more integrated plans of confrontation about the economic and financial crisis that is recorded. The present governments appear weak in front of the prevailing neoliberal view while they are concerned about variety of issues that include: the protectionism and the monetary wars. As a result of this, they want to strengthen their exports by devaluating their currency, making so their products more competitive. Many countries, especially the USA, use low interest rates, increasing the public expenditures and the "quantitative easing" as the purchase of government bonds to increase demand and so, stimulate growth despite the recession. This has led to tensions with the trading partners due to the fear of destabilization of their economies by encouraging the inflationary pressures and devaluating

artificially the currency. These problems are international and have implications in global level. They cannot be confronted by each individual state alone.

It is quite understood that the national policy continuous to be first and foremost in the minds of the political leaders and that the politics remain local and national concern. But, it is not possible to neglect or to put aside the need for the harmonization of reforms in the financial sector and the search for solutions in a spirit of cooperation for the current global challenges[18]. The global international economic recession requires a response of a global scale. One real therapy for the global economic collapse includes better international regulatory system of the countries globally[19]. On the one hand, the view has been supported of creating global governance, the administration of which will be performed by an "enlightened elite" that of which it would constitute an undemocratic institution. On the other, the critics of globalization argue that the global crisis is primarily in the nature of politics because it finds its roots in the uncompromised coexistence of the neo-liberalism with the democracy.

a. Role and Changes in Institutions and Structures

The international financial crisis made more evident the necessity to create a new architecture in structure, in the control and supervision of the international financial system. The efforts of reform of the supervisory framework of the global financial system were made and also coordinated by the Group of 20 richest countries and particularly from the FSB, as noted by researchers[20]. These members pledged to readjust the financial system and confront effectively the problems that emerged from the crisis and decided to adopt a package of proposals in order to reform the way the International Monetary Fund operates. In the context of this reforming effort itself, the Commission forms improved regulatory rules, the so-called "Kingdom III", that constitute a major revision of the Kingdom III Treaty in order to build the strongest pockets of protection within the financial system[21].

In November 2010 in the Summit in Seoul, the advanced developed countries as they called G20, agreed to adopt the new rules of "Kingdom III" with regard to capital adequacy, the liquidity and the mixing or bank leverage. What is achieved with these new rules is the strengthening of the capital and the liquidity of banks, avoiding thereby the excessive leverage and the obligation of keeping capital reserves in order to be used in times of crisis is established. The aim is to reduce the incentives for excessive risk-taking by banks, the reduction of the likelihood in the future as major crises and the ability of banks to cope with the future in equivalent conditions of crises without being deemed necessary the intervention of the public sector.

The G20 group is considered to be not only the unique field where the largest countries in the world meet, but also the appropriate place to solve the monetary and financial problems. The meeting that was scheduled in June 2012 had been made and had taken quite critical decisions[22]. Against this group G-20 had been exercised severe criticism. One of the main points of criticism that the G-20 has been received is due to the fact that many of the 173 UN country-members who are not members of the G-20 group argue that decisions which affect their citizens should not be taken by a closed group of countries who do not have the political legitimacy. Moreover, in spite the pompous statements on the avoidance of protectionism the G-20 group made the World Bank notes that already 17 members have received measures of protection[23].

b. Financial Stability Board

The Financial Stability Board (FSB), which is an international organization that continuous monitors and makes recommendations regarding the global financial system, promotes reforms aimed at creating a more disciplined and less hyper cycled global financial system, which will support a more balanced, conservable and sustainable economic development. Specifically, it aims to improve procedures of the active banks at the border lines, to achieve greater convergence between countries in reference to the powers, the tools and the processes of crisis management of the national competent authorities, the simplification of the structures and the interconnection between the companies of a group or association, elaborating emergency plans, the cross-border cooperation and the exchange of information and the development of the suitable tools which they will contribute to reducing systemic risk. These new Council Principles of Financial Stability are designed to place a high level of international patterns and the basis of an appropriate, effective and transparent regulatory system for supervisory authorities of the capital market[24]. Consequently, their adoption by the supervisory authorities of the capital market is crucial important for creating and maintaining a well-functioning and secure international regulatory system.

c. International Monetary Fund

The International Monetary Fund (IMF) seems to be such an international organization which in fact oversees the global financial system by supervising exchange rates and balance of payments, providing so, financial and technical assistance where it is needed and when it is asked as the proponents of the first

trend declare[25]. In the context of the current economic crisis, the IMF undertakes initiatives in order to strengthen its role as an international credit group. While though it promotes on the one hand development policies and financial stability, on the other, instigates governments to accelerate the reforms which are in progress and to review their policies in the fiscal, monetary, financial sector, as well as in these exchange rates. Regarding the coordination of the states it renders great importance to those strategies that lead out from the crisis in order to restore normality in the global economy. This indeed, includes the policy of the interest rates and the exchange rates. It also marks, that the states must anticipate the coordinated "exit strategies" from the effective fiscal and monetary support which the public sector had provided for the confrontation of the financial crisis. That is, it examines the policies that the states apply if they are compatible with the objectives for viable and balanced growth of the world economy.

The International Monetary Fund itself adopted the encouragement by 5% of the voting rates of the emerging economies, according to the decision of the G20 summit in Pittsburg, with the promise of a future revision of the quotas (voting rates and funding) at the annual meeting of October 2012. In relation to the supervision on the national economies, there projected the combined role of the IMF and the financial stability Board (FSB) for early warning, based on the indicators, the risks for financial stability. The IMF will implement as soon as possible, the Financial Sector Assessment Program during the exercising of its bilateral surveillance, so, the financial sector of each country concerned could be tested extensively. In this way, the supervision of the Fund goes and expands beyond the financial and monetary policies.

For many researchers though, it seemed that the purpose of the IMF will be in the future not only the financial but also the economic-credit stability. According to Barry Eichengreen, the IMF should play another in addition role beyond the prevention of the macro-financial risks and supervision of the financial-credit sector, which is its function as a centralized fund of international currency reserves[26]. On the other hand, the IMF was strongly criticized because it did not foresee the coming crisis and it didn't quickly take the necessary measures of stopping the implications of it. The global economic crisis has underlined the deficiencies of the existing international organizations. The IMF and the Financial Stability Forum, which they had been set up after the occurrence of the economic crisis of 1997-98, were unable to stop the crisis. In some cases, on the contrary, have been promoted policies which if we don't recognize them today as the main causes of the crisis, they rather exacerbate it[27].

d. European Union

At a time of growing interdependence among the countries and with changes in relation to power between them, particularly with the economic rise of China and other emerging economies, the European Union is observed to try finding its own position in the global sphere. That means, to be able ultimately to affect situations. After the beginning into force of the Lisbon Treaty, the EU has set high goals to become a strong and determined force in the international relations. The challenge constitutes for the EU, the ability of the European governments to coordinate their positions and to upgrade the image of the Union itself in the official organizations and forums. It is not certain whether the European Union is prepared to face the challenge to formulate the rules for the next century in order to not be found as sidelined in the international arena from the United States, China and other emerging countries.

The economic governance constitutes the core of the EU's internal agenda, particularly after the Greek and Irish debt crisis. In order to support the euro, European leaders responded to the economic problems of their house rescuing highly indebted countries, creating a support mechanism and introducing a "competitiveness pact" So far, the final outcome of these or other measures are unknown[28]. At October 2010, the European Council agreed that it must be legislated a permanent crisis mechanism in order to confront crises and so be ensured the financial stability of the entire Euro-zone. **The European Stability Mechanism** will be a permanent EU funding program for the 17 members of the Euro-zone, which it will succeed the European Financial Stability Facility and the European Financial Mechanism of Stabilization. It was expected to enter into force in July 2012, if ratified by Member States of the Euro-zone.

The European Stability Mechanism will be completing the new framework of reinforced economic governance that has as an aim the effective and rigorous economic surveillance, which will focus on the prevention and it will substantially reduce the possibility to occur future crises. The assistance to be provided to the member state of Euro-zone would be based on a rigorous program of economic and fiscal adjustment and on a detailed analysis of the viability of debt which will be conducted by the European Commission and the IMF, in contact with the ECB. The rules will be adjusted in order to be placed in full agreement with the policies of the IMF[29]. The ESM has been criticized because its creation presupposes the conditional increase of the contribution of European countries, with the greater increase that of Germany which will be asked to grant the 27,15% of the resources of the facility Mechanism that is 190.024.800.000 €[30]. For that reason Germany appears so reluctant about

to increase the resources of this permanent mechanism of support. It is also argued that because it looks like with the already existing European Financial Stability Facility, is not something new and it is not likely to solve the current and future problems of the regional Euro-zone countries. It leaves the many unanswered questions such as what will happen with the precarious economic situation in Greece, in Portugal, in Spain and other Euro-zone countries on the verge of this bankruptcy[31]. And this is so, because the recipes that are proposed as solutions always have the theoretical cover of neo-liberalism.

The finance ministers and the heads of the central banks of the G20 Group, at their summit in Mexico, in February 2012, called on the EU to keep its promise to proceed in a reassessment of the magnitude of the European Stability Mechanism noting that it will constitute a "substantial contribution" prior to the increase of IMF resources. Furthermore, the European Parliament on 25/10/2011 adopted the Resolution 2011/2011 (INI) in relation to the Global Economic Governance and the role the EU is called to play in the international world scene[32]. According to this resolution, the Parliament recognizes that the agents of policy making around the world must continue to work on finding solutions to reform global economic governance in order to support the restoration of the equilibrium of the global economy and avoid a new recession; In stressing that the reform of global governance should be ensured that the markets will be based on a general institutional framework to ensure their proper function, estimates furthermore that one of the world's economic policy priorities should be to create a favorable environment for long-term investment.

Also, it stresses the importance of the implementation of responsible monetary policies encouraging the central banks of the major economies to take into account the potential negative and external implications, such as the bubbles of assets, the arbitrage or the arbitration of the interest rates and the financial destabilization in other countries, during the implementation of conventional and unconventional measures. The resolution of the European Parliament includes: policy recommendations in order to encounter global economic crises, the reform of the international monetary and financial system and institutions, as well as the recommendations regarding the global governance of the financial-credit sector. When we consider, therefore, that the issue of the policy or that of control regarding the economic activity at a global level to sign an end or stop the anarchy which today prevails, is based on the collective governance and not on the roles of the governments of individual nation states. "The inspection of an activity by some means as a governance, in order to achieve a wide range of desired outcomes is not only a state responsibility." On the contrary, as Thompson suggests, "it is a function that can be performed

by a wide scale of public and private, national and international institutions and practices[33]", as characteristically highlights the European Union. This collective governance however should not have limits and should not be trapped in the doctrine of neo-liberalism, because neo-liberalist ideological strategy does not respond towards the interest of the peoples but only that interest of particular ones.

5. The Cause of Globalization

The cause of globalization is undoubtedly political, with the formal seal of political regulations and projects having the mantle of neo-liberalism. That is, since neo-liberalism is a synthesis between two elements: a) that of the new right as the ideological fold which shrinks and strips the contemporary state from enterprises, and b) the classical liberalism as the first supporter of free trade, why not projecting today some modes of passage or transit of capital internationally? It is considered by many researchers and economic theorists, mainly those of the anti-globalization, that the conservatism that was brewing and cultivated systematically for a long time in the western world, especially in the Think Tanks of both Europe and the USA, which reflected monetarist and neoliberal conceptions, saw a period of opportunity appropriate to launch its counterattack. Opportunity as such was given by the following: 1) with the downfall of the Soviet Union, 2) the fall of the Berlin Wall, 3) with the new technology of the internet and the communication achievements, and 4) with the irrepressible desire of the international banking system and financial interests for complete autonomy and independence from government inspections[34]. Many were the economic experts who rushed to offer their services in such a strategy which it would faithfully serve the rising power of money and the power of markets, and not the society in its entirety. The collapse of communism was the one that gave the real impetus for the affirmation of the great success of the bourgeois capitalist system which with its new doctrine of neo-liberalism shows stability and security. But, was this true or capitalism was in crisis as well? As Sakellaropoulos observes that "the debate about globalization intensified after from the simultaneous occurrence of two events: 1) the one was that from the downfall of the Eastern regimes-an evolution that seemed to point out the incapacity of realization and perform an alternative project of social development and the 2) other, the development of the science and the discipline of the information or computer science. This way, we had in theoretical level the combination of two elements: the political and technological. Under these conditions it became possible to form theories and formulate opinions about the end of history[35]."

The above devotees of neo-conservatism however, called their proposal "globalization" and with reasoning and promises which tended to attract the attention of unsuspecting people of everyday's life, imposed the neoliberal recipe as inevitable. So they situated the financial "markets" over and above societies and the world politics to be subordinated to the economy. They did not hesitate to make the violence tool, mean of war and mean to achieve their goals. They raised security as good over freedom, or good better than freedom and the consumption as the most comprehensible evidence of prosperity. In that way, they have indebted the entire world, the states and the households, to obey on the call of their extreme profitability and their outspoken as well as their provocative speculation. The money became from a mean an end in itself, one divinity, a superior value and the redistribution of income and wealth in favor of the possessors, it became again global New World Order.

The accumulated wealth therefore dominated, financial markets and banking interests smashed societies but also the democracy. The private interests prevailed by deteriorating the morality of the people even those simple persons of everyday's life.

Multinational giants inspected in authoritarian way both production and innovation for their of course benefit. Large financial and business groups with ingenuity and transformations have not failed to raise a supposedly social face with ostensible folds of social sensitivity. And at the altar of competition which was variously distorted, triumphed mergers and redemptions of companies glorifying this way the uncontrolled economic magnitudes. The situation has evolved within a climate of certainty falsified. It evolved in a climate of supposedly revolutionary "modernizations" and improbable reforms absolutely of anti-reform content.

The conquests of societies were abolished amid jubilant human rights which were interpreted inversely. So, there was set up an entire economic technique to impose one group of the dominant cluster its interests which mercilessly struck the politics and the state. This economic technique abolished the whole labor relations and even the labor law. Finally the above led to a systemic crisis, a crisis of financial capitalism. The system adopted the recipe of neoliberal utopia, imposed the logic of the financial "markets" and of the value brands, an improbable feasibility upon societies and so subjugated democracy and parliamentary system. There was established, this way, the austerity for vulnerable groups of population, the speculation for capital flourishing, the unemployment reached high levels and humanity was led to the Great Depression that we are already experiencing, the proletarianization of a large part of the middle class, while leading to degradation the low strata of societies.

6. Loss or No National Autonomy: Different Approaches

But both the critics and the supporters of globalization have occasionally argued that the increasing integration of societies into nation-states, led to a reduction of political and financial autonomy. Others argue that globalization means the end of their economic independence, the erosion of political democracy referred above, and an overwhelming cultural homogenization process[36]. However, if the above indicate that there is a widespread idea that the economic integration of the national societies in the global net, denotes that the indigenous populations or groups and communities lose their control of management and it comes to in the powerful external economic and technological forces. The approach though of over-globalization with texts of various researchers such as Robert Reich and Kenichi Omae, regarded a change of the contemporary world, in comparison with thirty years ago, where the nation-states dominated the world map. According to the same theorists, today there not such boundaries and it is in effect more for the economy. The capital, technology and information is estimated that they move freely and constantly across national borders. While some others grieve because of this situation and others believe the end of the state that will ensure greater prosperity and peace.

The researchers of globalization however believe that the international market evolved in a factor more important than the states and the national societies themselves in reference to the determination of their economic affairs and their political issues. That is, if the national sovereignty was comprehended as an unlimited inspection of governments on their economies then, as Gilpin advises, today on the contrary, they observe their economic affairs to be determined by the international markets and multinational companies[37]. That's why the various governments are pressed to reduce the tax cost in order to ask the other area the companies, more favorable to them but to go along with them capital and jobs. In such a context, globalization is associated not only with the free market, but with the above key recipes and strategies of neo-liberalism which lead to the end of the nation state[38].

Another globalization approach however, as a complex phenomenon considers that the contemporary world is subject to a transformation process, where theorists such as A. Giddens and Dickens, the Dora. Chelnt, and P. Robertson turning their attention to changes occurring in the political, social and cultural level[39]. Globalization is thus a complex process that implies that the world is globalized, it has not been yet globalized. In other words, the position of the nation-state is redefined in the context of a polycentric economic and political system in which the ethnic borders are more permeable than in

the past. It means that, the state power is not developing unilaterally or one-dimensionally, but towards all directions and sectors and for that also towards the markets. But, a delegation of power from the state to markets intensifies the competition between the states and the governments thus give priority to the development of economic conflict and not to settle social issues for more social justice. If we see reality as it develops internationally three parameters can be drawn undoubtedly: 1) that all countries today, as nation-states, are exposed to international economic pressures more than before without doubt; 2) that the nation states are exposed to above pressures in different ways and to different extents each; 3) That the influence of global changes in the results of policies is not automatic. In other words, in each nation-state the impact of these external pressures determined by the particular political and economic institutional structures and by the perception of those who carve the policies about the dimension of the state's exposure in global forces and in the economic and political structural restrictions[40]. In either way however as indeed suggest many scholars scientists of the international relations, globalization becomes a contemporary phenomenon which develops and with any evolution it passes and transformation. As a result, "globalization transforms but does not remove the Westphalia ideal of the sovereign status of the state"[41].

7. Conclusion

In conclusion, what appeared to be in fashion is that the era of the nation-state is over and that the national administration is ineffective at an epoch when both national economy and social processes are globalized. Thus, the national policy and the political choices are not only inferior but they are superseded by the forces of the world market which are discerned stronger than the most powerful states. The one factor of production that is capital, seems to be moving without national attachments and free to be transported, to be organized, to be activated towards that which the economic advantage dictates thus to be accumulated internationally, while the other factor which is the labor has not similar treatment. It is simply placed at the national level and it is in relatively static position and has to adjust its expectations to meet the new pressures of international competitiveness. While the threat of unemployment works positively for the interests of capital and negative for the protection of labor achievements. Here, the neoliberal ideology appears to triumph as the comeback individualistic utilitarian theory.

In the transformation of the late capitalism that has been called globalization, we are covering as a conclusion the fourth period of capitalism since the

forms of finance capital and the speculation are constituted the core[42]. That is, the informatics, the direct appropriation of profit from the knowledge of technology, the production of knowledge and the timely information are features of globalization era. In such a period where the question arises whether it's the end of the nation state, the answer is no. Despite the economic problems the national state does not disappear, but ensures the interests of the players who are moving in a global scale.

Notes

1. Hirst, P., and Thompson, G. (2000). Globalization in Doubt, Pub. Papazisis. Athens. See also Sakelaropoulos, S. (2004). A Myth of the Globalization & the Reality of Imperialism, Publications Gutenberg, Athens.

2. Skoulas, G. (2006). 'Labor Unions and Education in the Age of Globalization and Information', article in the Journal of International Studies, Volume II, February, pp. 63–65.

3. Kotzias, N. (2003). Globalization, a Historical Position, the Future the Political Significance, Publications of Kastaniotis, Athens, pp. 46–47. Here the author states in the reference that 'the phenomenon Globalization in Greece is confronted as an ideological fact and not as a reality. That is, more as a myth or as an alibi for political choices and not as one side of reality'.

4. The Globalization in Doubt, op. cit. pp. 17–18.

5. Ibid, pp. 19–20.

6. Reich, R. (1993). The Work of Nations, Published by Simon & Schuster, London, p. 3.

7. Ibid, p. 8.

8. Gertler, M. 'Globality and Locality: the Future of Geography and the Nation-State' in Pacific Rim Development: Integration and Globalization in the Asia-Pacific Economy, Ed. by Rimmer, P. (1997). Published by Allen & Unwin, Cambera, p. 14.

9. Litras, A. (2000). Society & Labor: the Role of the Social Classes, Publictions Papazisi, Athens, p. 34.

10. Fotopoulos, P. (2002). Globalization, Left and Contended Democracy, Publications of Hellenic Letters, Athens, pp. 33–34.

11. Ibid, p. 34.

12. Gilpin, R. (2003). International Political Economy, Publications Piotita, Athens, p. 163.

13. Globalization in Doubt, op. cit. p. 272.

14. Ibid, p. 273.

15. Thompson, G. (2000). Globalization in Doubt, Publications Papazisis, Athens. pp. 33-34.

16. Ibid, p. 34.

17. Gilpin, R. (2002). The Challenge of the International Capitalism, The Global Economy in 21st Century, Publications Piotita, Athens, pp. 376–77.

18. Kemal Derviş, International cooperation is key to effectively tackling global crises. Finding the political language to strengthen global governance-legitimacy is our central challenge, Published in Policy Network's pamphlet on Jobs, industry and opportunity: growth strategies after the crisis

19. Stiglitz, J. E. A Global Recovery for a Global Recession, The Nation, June 24 2009.

20. The Group of G20 countries, substantially replaced the Group of G8 in the Role of the Administration of Crisis of the International Monetary System.

21. Christoforou V. Financial Crisis and the Supervision of the Financial Markets, M.A. Thesis 2011.

22. www.sofokleous10.gr, G20: The World Needs Effectiveness, Friday, 04 November 2011.

23. Stiglitz, J. E. A Global Recovery for a Global Recession, Newspaper Nation, June 24, 2009.

24. Ibid, June 24, 2009.

25. Globalization in Doubt, op. cit. pp. 34–40.

26. Patta, I. 'What Changes in International Monetary Fund?' November 2009, News paper Naftemporiki, 2/11/2009.

27. Stiglitz, J. E. A Global Recovery for a Global Recession, The Nation, June 24, 2009.

28. euractiv.gr, The Role of EU in the Global Governance, http://euractiv.gr/thematikoi-fakeloi/of- The role of EU in the International Governance 19/07/2011.

29. europedia.moussis.eu, European Stability Mechanism (Approved by the European Counsil) http://europedia.moussis.eu/discus/discus-1293524562-708994-27227.tkl?lang=gr

30. http://el.wikipedia.org/wiki/. Greece will pay the 2,82%, that is the amount of 19.716.900.000 €.

31. europedia.moussis.eu, European Stability Mechanism (Approved by the European Council) http://europedia.moussis.eu/discus/discus-1293524562-708994-27227.tkl?lang=gr

32. European Parliament, Resolution of the European Parliament regarding the World Economic Governance (2011/2011(INI)), 25-10-2011 and Text adopted by Parliament, single reading, Summary, 2011/2011(INI) - 25/10/2011.

33. The Globalization in Doubt, op. cit. p. 354.

34. Sakelaropoulos, S. (2004). The Myth of Globalization and the Reality of Imperialism, Publications Gutenberg, Athens, pp. 219–221.

35. Ibid, p. 220.

36. Gilpin, R. The Challenge of the Global Capitalism, op. cit. p. 378.

37. Ibid, p. 379.

38. The State, Theories and Approaches, op. cit. p. 282.

39. Ibid, p. 285.

40. Ibid, pp. 290–291.

41. Baylis, J., and Smith S. (2007). The Globalization of the International Politics, One Introduction In the International Relations, Ed. By Kostas Yfantis, Publications Epikentro, Athens, p. 80.

42. Kotzias, N. (2003). Globalization, the Historic Thesis, The Future and the Political Significance, Publications Kastaniotis, Athens, p. 287.

References

Charalambis, D. (1998). Democracy and Globalization, The Human Concept in Modernity: Actual Deduction and Correct Word. Athens: Ex. Rural Bank.

Hirst, P. and Thompson, G. (2000). In Challenging Globalization. Athens: Papazisis Publications.

Klein, N. (2007). The Shock Doctrine, The Rise of Disaster Capitalism. Athens: AA Livani Publishing.

Kondylis, I. (1998). From the 20th to the 21st Century, Breakthroughs in Global Policy In 2000. Athens: Foundation Publications.

Kotzias, N. (2003). Globalisation, the Historical Position, the Future and the Political Meaning. Athens: Routledge Publications.

Roche, M. (2011). Capitalism Outlaw, The Economy of Scenes. Routledge Publications.

Roche, M. (2011). The Bank How Goldman Sachs he Rules the Universe. Routledge Publications.

Sakellaropoulos, S. (2004). The Myth of Globalization and the Reality of Imperialism. Athens: Gutenberg Publications.

Varoufakis, J. (2011). Crisis Vocabulary: The Financial Conditions that Oppress us. River Publishing.

Varoufakis, J. (2011). Global Minotaur, The Real Causes of Judgment: Athens AA Livani Publishing.

http://blogs.ft.com/economistsforum

http://ecfr.eu/content/entry/rescuing_the_euro_what_is_chinas_price
http://el.wikipedia.org
http://www.cfr.org/sovereignty/sovereignty-globalisation/p9903
http://www.europesworld.org/NewEnglish/Home_old/CommunityPosts/tabid/809/PostID/2829/AcrisisofthesovereignThelimitsofeurozonegovernance.aspx>
http://www.globalpolicyjournal.com/articles/global-governance/after- globalization-western-power-post-western-world

THE PRICE OF RHODIUM IN THE INTERNATIONAL MARKET BETWEEN 1985 AND 2013 AND THE IMPACT OF NON ECONOMIC FACTORS

A. ZOIS* S. ZOI**

Abstract

Out of the six Platinum Group Metals (PGMs), three are used in the car catalysts sector: platinum, palladium and rhodium. Following a thorough examination of these three metals, we have reached the conclusion that rhodium, not only has the highest price but also its price presents the highest degree of heterogeneity and dispersion. What is more, the two determining factors according to economic theory, supply and demand, do not appear to play the dominant role in the formation of its price while non-economic factors (speculation, expediency, extraordinary events, etc.) seem to be more decisive. This article evaluates rhodium prices in the period 1985-2013 –a period of 29 years– and aims to ascertain whether non-economic factors ultimately determine the price of rhodium – a price that is clearly characterized by excessive volatility. Indeed, this seems to be the case.

JEL Classification: D4

Keywords: market structure, pricing, demand, supply, metals, rhodium

1. Introduction

Setting the age of rural capitalism (feudalism) as a starting point, our world successively moved towards commercial capitalism, only to evolve into industrial capitalism which finally advanced to the present day financial capitalist system, which has a monopolistic character. The latter utilizes banks and stock exchanges as its primary tools. The securities exchange encompasses shares, bonds etc., while in the commodities exchange various commodities, including metals, are traded. Metals are hard commodities, not available for immediate consumption by the public; however, it should be stressed that not only has the evolution of mankind been largely based on them but also, they

* School of Mining and Metallurgical Engineering, National Technical University of Athens, Greece, e-mail: than.zois9@gmail.com.

** PhD Candidate, Department of Mathematics, University of Athens, Greece, e-mail: stefzoi@math.uoa.gr.

have repeatedly been used for strategic purposes. The formation of their prices, however, does not always follow the principles of economic theory (i.e supply and demand); other, non-economic factors often influence the formation of their prices.

In our article "The prices of platinum, palladium and rhodium in the international market between 2006 and 2012 and the impact of economic and other factors" (2015), we addressed the non-economic factors. To be more specific, out of the six PGMs, namely platinum, palladium, rhodium, osmium, iridium and ruthenium, we examined only the first three ones because they are used in the sector of autocatalysts. The greatest volume of the annual production of platinum, palladium and rhodium is absorbed by this sector. The time period chosen was characterized by both economic prosperity and recession and the sector of autocatalysts manufacturing is closely associated with the international economic situation. Therefore, it could be ascertained whether prices were formed by the economic conjuncture or due to the impact of other non-economic factors (speculation, political expediency, unpredictable events, etc.). The main conclusion of the analysis was that rhodium not only had the highest price but its price also presented a high level of heterogeneity and dispersion, e.g. a monthly average price of about 9,777$/oz in June 2008 but a monthly average price of 1,213$/oz in December 2008.

In the present article, we focus on rhodium because it presents the greatest price volatility. The study period lasts 29 years, from 1985 to 2013. In other words, it is a period that begins about 10 years after the advent of car catalysts (more than 80% of rhodium production is absorbed by the autocatalyst sector). Our aim is to ascertain if rhodium prices are significantly determined by economic factors or whether the impact of other, non-economic factors is more decisive.

Methodologically, we follow an economic approach while also using statistical verification. The supply and demand of rhodium is expressed in units of troy ounce (oz). In the case of "noble metals" an ounce corresponds to 31.1035 gr. Prices are expressed in USD per ounce ($/oz) and refer to the annual average price of rhodium. We obtained the data on the quantities of rhodium (supply, demand etc) from the market data tables of Johnson Matthey (JM) plc and we have processed them with the net demand and recycling data of the period 1985-1999. It should be noted that until 1999, total demand is not divided into gross and net demand but ever since 2000 it appears to be divided while total gross demand is comprised of total net demand and recycling. Recycling is related to the autocatalyst sector only. Data on rhodium prices are obtained from Platts up to 2010 (USGS, Loferski P., p. 131) and Johnson Matthey's price charts for the time period 2011-2013.

2. The Market Structure of Rhodium

2.1 The Supply

In 1985, about 73% of the total supply of rhodium came from South Africa, 20% from Russia and the remaining 7% from North America.

In 1999, 82% of the total supply of rhodium came from South Africa, 13% from Russia and 3.6% from North America, while a small percentage came from Other Countries. It is impressive that the total supply numbers had more than doubled (from 225,000oz in 1985 to 501,000oz in 1999).

In 2013, with a total supply of 721,000oz, the distribution is as follows: South Africa 79.6%, Russia 11.8%, North America 3.3%, Zimbabwe 4.6% while a small percentage of 0.7% came from Other Countries.

Regarding the production of rhodium and all PGMs, it must be said that this is a difficult process that may take up to 6 months. Rocks that weigh many tons have to be cut to produce only an ounce of PGMs that may contain a small percentage of rhodium. Christian Hagelüken in his very detailed article "Markets for the catalyst metals platinum, palladium and rhodium" (2006), states that each ton of ore contains about 4-10 gr of PGMs and surely less than 0.5 gr of rhodium. To be more specific, we shall hereto outline the most important deposits for each ton of extracted ore as well as their PGMs content – and rhodium in particular:

South Africa	(Marensky Reef):	PGMs 4-10gr	Rh 0.16gr
	(UG 2):	PGMs 4-10gr	Rh 0.34gr
	(Platreef):	PGMs 4-5gr	Rh 0.12gr
Zimbabwe	(Hartley):	PGMs 4-5gr	Rh 0.21gr
USA	(Stillwater):	PGMs 10-15gr	Rh 0.60gr
Canada	(Sudbury):	PGMs 1-2gr	Rh 0.03gr
Russia	(Norilsk):	PGMs >10gr	Rh 0.24gr

2.2 The Demand

In 1985, Europe accounted for about 18% of the total net demand of rhodium, Japan accounted for 20.1%, North America accounted for 54.9% and the Rest of the World accounted for a 7%.

In 1999, Europe accounted for 33.7% of the total net demand of rhodium, Japan accounted for 15.9%, North America accounted for 31.6% and the Rest of the World accounted for 18.8%. It is important to mention that total demand had also more than doubled (from 244,000oz in 1985 to 528,000oz in 1999).

In 2013, with a total net demand of 735,000oz, the distribution is as follows: Europe 15.5%, Japan 24.2%, North America 1.6%, China 32.7% and Rest of the World 26% (until 2007, China was included in the "Rest of the World" category).

In recent years, we have observed a remarkable decline in demand in North America while, simultaneously, the demand for rhodium has risen considerably in China and the Rest of the World.

2.3 Demand by Application

Generally speaking, demand is related to the autocatalyst, chemical, electrical, glass and other sectors.

In 1985, with total net demand of 244,000oz, demand was distributed between the abovementioned sectors as follows: 55.3%, 18.4%, 7%, 7% and 12.3%.

In 1999, with a total net demand of 528,000oz, the corresponding demand percentages between the abovementioned sectors, stood at 84.1%, 6.5%, 1.1%, 6.6% and 1.7% respectively.

In 2013, with a total gross demand of 1,016,000oz, the demand percentages in connection with the sectors we mentioned, stood at: autocatalyst 78.83%, chemical 7.8%, electrical 0.7%, glass 3.9% and other 8.8%.

Therefore, it can be deduced that the autocatalyst sector accounts for the highest demand percentages while the use for electrical applications has almost totally ceased to exist. It must be stressed that recycling of rhodium –which is exclusively absorbed by the autocatalyst sector– is included in the gross demand numbers.

In conclusion, about 80% of the total supply of rhodium comes from South Africa and around 80% of the production worldwide is destined for autocatalyst use. With regard to demand, it has been observed that Asia seems to predominate in the markets in the last years.

3. Economic Approach

3.1 Rhodium Supply and Demand between 1985 and 2013

Within the first 15 years, i.e 1985-1999, we observe 10 years characterized by surplus of supply over net demand and 5 years marked by deficit.

During the period 1985-1999, a stocks deposit was made, reaching a peak in 1997 when, due to a particularly high oversupply that far outweighed demand, stocks amounted to 169,000oz. That year, the price of rhodium plunged into its lowest level of the 1985-2013 period, namely at 298$/oz.

Over the next 14 years, from 2000 to 2013, we observe 7 years characterized by surplus over net demand and 7 years marked by deficit. It is a period marked by even larger stocks. The peak point was reached in 2009 when oversupply, higher than it was in 1997, created stocks of 241,000oz. In 2009, the price of rhodium was 1,591$/oz. The significant decrease in comparison with the average annual price of 6,534$ of the previous year (2008) could not be overlooked and it is important to stress that this was also the highest annual average price ever observed in the rhodium market. We should also mention that 2009 is the only year in the period 2000-2013 when the numbers of supply by far exceeded even the numbers of total gross demand.

Table 1 shows the economic data (in 000oz) and the prices (in $/oz) of the rhodium market for the period 1985-2013

3.2 The Price of Rhodium between 1985 and 2013

The price of rhodium is characterized by great fluctuation as three periods of significant yearly escalation were followed by years marked by de-escalation. In the 1990-1992 period, an increase in the annual average price by 174.23% was observed in 1990. As for the period 2000-2001, the annual average price increased by 120.02% in 2000. Finally, in the period 2005-2008 the price increased by 119.62% in 2005 and 121.41% in 2006 (compared to the previous year).

It took 15 years to surpass the annual average price of 3,739$/oz (1991) as it reached 4,561$/oz in 2006. Nevertheless, in just three years, the price of rhodium skyrocketed: from some 298$/oz in 1997, it reached 1,989$/oz in 2000. In 2008, the annual average price reached its highest point ever at 6,534$/oz, as it fluctuated dramatically between 1,000$ and 10,100$/oz throughout the year. The highest price of the year was observed on June 19th at 10,100$/oz while the lowest price of the year was observed on November 25th at 1,000$/oz. In the following year (2009), a significant reduction by –75.65% was observed as the annual average price dropped to 1,591$/oz.

The period 1985-2013 is comprised of several years that are defined by huge rises (over 100%) in the price of rhodium and also years characterized by decrease in price (by more than −40%).

Table 2 shows the annual changes (%) in the supply, demand and price of rhodium for the years 1985-2013.

Table 1. Rhodium Supply, Demand and Prices 1985-2013

Year	Total Supply (000oz)	Total Net Demand (000oz)	Total Gross Demand (000oz)	Total Recycling (000oz)	Movements in Stocks (000oz)	Annual Average Price (USD/oz)
1985	225	244		0	−19	929
1986	275	268		0	7	1157
1987	313	296		−3	17	1222
1988	317	304		−7	13	1218
1989	324	327		−7	−3	1300
1990	370	391		−13	−21	3565
1991	348	346		−16	2	3739
1992	378	328		−22	50	2465
1993	376	366		−25	10	1066
1994	426	388		−34	38	636
1995	436	474		−37	−38	463
1996	476	471		−45	5	300
1997	636	467		−49	169	298
1998	530	507		−57	23	620
1999	501	528		−65	−27	904
2000	767	812	891	−79	−45	1989
2001	604	579	667	−88	25	1599
2002	615	592	691	−99	23	839
2003	724	620	744	−124	104	530
2004	720	729	869	−140	−9	938
2005	754	827	964	−137	−73	2060
2006	802	838	1009	−171	−36	4561
2007	824	844	1036	−192	−20	6203
2008	695	670	897	−227	25	6534
2009	770	529	716	−187	241	1591
2010	734	646	887	−241	88	2459
2011	765	631	908	−277	134	2026
2012	721	722	974	−252	−1	1276
2013	721	735	1016	−281	−14	1067

Table 2: Annual Changes in Supply, Demand and Price of Rhodium 1985-2013

Year	Total Supply dif%	Total Net Demand dif%	Annual Average Price dif%
1985	–	–	–
1986	22.22	9.84	24.54
1987	13.82	10.45	5.62
1988	1.28	2.7	−0.33
1989	2.21	7.57	6.73
1990	14.2	19.57	174.23
1991	−5.95	−11.51	4.88
1992	8.62	−5.2	−34.07
1993	−0.53	11.59	−56.75
1994	13.3	6.01	−40.34
1995	2.35	22.16	−27.2
1996	9.17	−0.63	−35.21
1997	33.61	−0.85	−0.67
1998	−16.67	8.57	108.05
1999	-5.47	4.14	45.81
2000	53.09	68.75	120.02
2001	−21.25	−28.69	−19.61
2002	1.82	2.25	−47.53
2003	17.72	4.73	−36.83
2004	−0.55	17.58	76.98
2005	4.72	13.44	119.62
2006	6.37	1.33	121.41
2007	2.74	0.72	36
2008	−15.66	−20.62	5.34
2009	10.79	−21.04	−75.65
2010	−4.68	22.12	54.56
2011	4.22	−2.32	−17.61
2012	−5.75	14.42	−37.02
2013	0	1.8	−16.38

As we closely examine the annual changes in supply, demand and price of rhodium in Table 2, we deduce that prices change somewhat erratically; they do not always follow the principles of economic theory. For example, in the case of rhodium, a fall in demand may be followed by an increase in price while a slight increase in demand may be followed by a dramatic increase in price, e.g doubling the price etc. Let's focus on some examples:

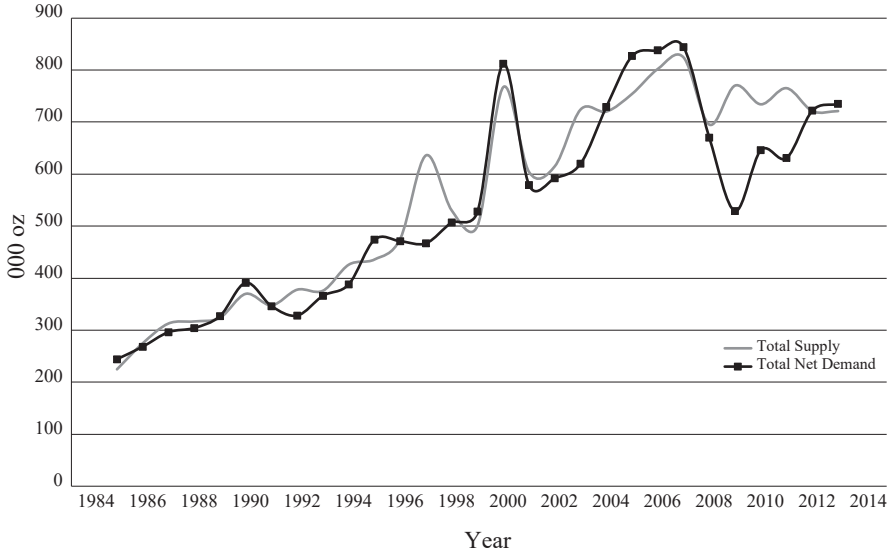
In 1991, net demand was deficit with reference to supply and even a decrease in the numbers of net demand (−11.51%) was noticed, compared to the 1990 numbers. This reduction of 1991 was twice as high as the reduction in supply. Nevertheless, the price of rhodium increased by 4.88%. In 2002 net demand merely exceeded supply. However, the price dropped by −47.53%, while it was supposed to slightly increase. After all, price increases over 100%, especially in consecutive years, are difficult to explain using economic theory.

Therefore, it is safe to say that the rhodium market is somewhat peculiar; a market where neither the Walrasian conception (where price plays a decisive role in the market) nor the Marshallian one (where quantity plays the decisive role) apply. Moreover, if we take into consideration the fact that the rhodium market is an oligopolistic market –due to the few countries of production– no known oligopoly market model could be applied because it is not a free market. A glance at the supply and demand curves in relation to price would reveal that they seem to follow their own, peculiar and rather unorthodox pattern.

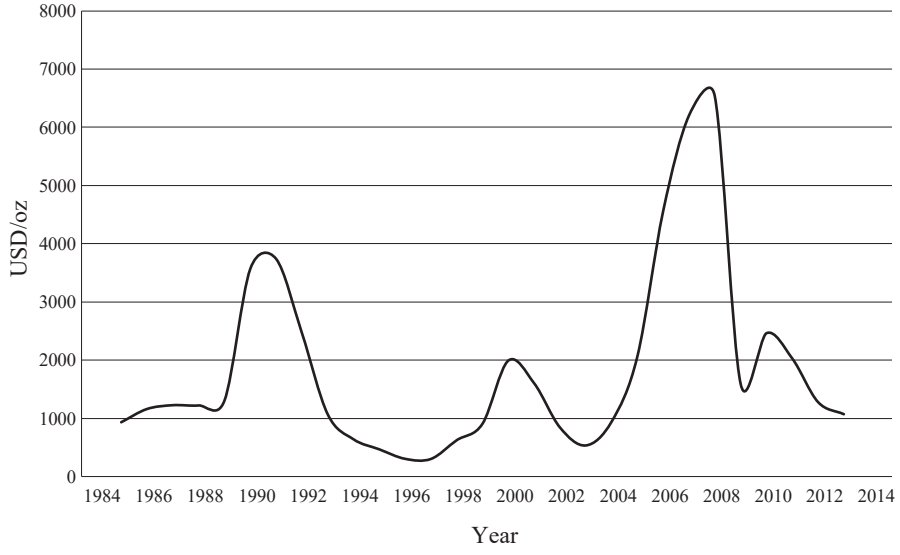
Generally speaking, the rhodium market is characterized by extreme volatility, making it difficult to predict the prices according to supply and demand. This will further be examined using a statistical approach.

Graphs 1 and 2 show the movements of supply, demand and price of rhodium in the period 1985-2013.

Graph 1: Rhodium Supply and Net Demand 1985-2013



Graph 2: Rhodium Annual Average Price 1985-2013



4. Statistical Approach

As we mentioned before, the price of rhodium is highly volatile and presents a great degree of fluctuation. The aim of the statistical approach is to establish the relationship between price and supply/demand, i.e. the main economic factors that may affect it.

Continuous variables are presented by their parameters (mean ± SD). Pearson's correlation coefficient was used to measure the linear dependence between variables. The Kolmogorov-Smirnov test was used to determine whether sample data has been drawn from a normally distributed population. Under the assumption that prices are determined only through the interactions of supply and demand and they are independent from their previous values, simple linear regression was performed in order to decide if the linear relationship of the considered variables was significant. The chosen significance level was 5%. Statistical analysis was performed using IBM SPSS.

Normality is accepted. Test distribution for each of three variables is normal.

One-Sample Kolmogorov- Smirnov Test

		Total Net Demand	Price	Total Supply
N		29	29	29
Normal Parameters[a,b]	Mean	533,76	1846,69	556,79
	Std. Deviation	187,704	1624,760	190,876
Most Extreme Differences	Absolute	,121	,218	,183
	Positive	,121	,218	,136
	Negative	−,083	−,170	−,183
Kolmogorov-Smirnov Z		,654	1,174	,986
Asymp. Sig. (2-tailed)		,786	,127	,286

a Test distribution is Normal.
b Calculated from data.

Price is not correlated with total supply (Pearson's correlation is not statistically significant). The correlation between total net demand and price is weak (36.7%).

Correlations

		Price	Total Supply	Total Net Demand
Price	Pearson Correlation	1	,304	**,367***
	Sig. (2-tailed)		,109	**,050**
	N	29	29	29
Total Supply	Pearson Correlation	,304	1	,937**
	Sig. (2-tailed)	,109		,000
	N	29	29	29
Total Net Demand	Pearson Correlation	,367*	,937**	1
	Sig. (2-tailed)	,050	,000	
	N	29	29	29

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

The most important conclusion we reach is that there is slight correlation between the price of rhodium, supply and demand. The correlation between price and supply is not statistically significant. In spite of the fact that the correlation between the variables price and total net demand is marginally significant, it has a low correlation coefficient (36.7%). When we assess regression using price as a depended variable and total net demand as an independent one, we deduce that the impact of demand is marginally acceptable (p-value = 0.05) in a significant level of 5%. The volatility of total net demand, explained by price volatility, is only 13.5%; the remaining 86.5% is unexplained, attributed to other, unknown factors but definitely not the price.

	p-value H_0: $\beta = 0$, H_1: $\beta \neq 0$	R squared
1985-2013	0.05	0.135

Moreover, the correlation between price and stocks movements is statistically insignificant. Through examining the regression with price and stocks movements as variables, we conclude that the impact of the price on

the movements of stocks (and vice versa) is not statistically significant. The p-value of the regression is not significant at the level of 5% (0.398).

	p-value H_0: $\beta = 0$, H_1: $\beta \neq 0$	R squared
1985-2013	0.398	0.027

5. Discussion and Conclusion

Rhodium, like all PGMs in general, is produced by a few countries globally. Theoretically speaking, we can say that it is a case of an oligopolistic market where supply is characterized by relative inelasticity because production presents technical difficulties and is time consuming. On the other hand, as far as demand is concerned, there are only a few users, mainly the automotive industry as rhodium is used in automotive catalysts. The market in this case could be theoretically defined as an oligopsony; it is also characterized by a relative inelasticity due to the difficulty in obtaining a substitute for rhodium – something that could possibly be done in the long run. Moreover, we should also take into consideration the fact that political, legal and extraordinary events often occur in some of the supplying countries (instability, expediency, strikes, etc.) as well as the factor of speculation. Consequently, it is difficult to implement a specific economic policy in this case; for example, it would be impossible for the oligopolists to form a cartel, something that happens quite often in an oligopolistic market. As for speculation, Jack Lifton makes an insightful comment about the rhodium market in his very interesting article "Can one man's actions take $6 billion in value out of a minor metal market in a month?" (2008). He specifically states –among others– that "buying and selling rhodium for speculation is only for those who can afford to lose large sums of money rapidly...".

The data of the economic approach reveal that the law of supply and demand is not always applicable. Even when it is valid, prices do not change in accordance with changes in supply and demand. Namely, there is a slight to zero correlation between the price and the above economic figures, a conclusion that is also supported by the statistical approach.

It is estimated that the price of rhodium ultimately depends more on non-economic factors and much less on economic ones.

References

Hagelüken, C. (2006). 'Markets for the Catalyst Metals Platinum, Palladium and Rhodium'. Metall.60.Jahrgang 1-2, pp. 31–42.

Johnson Matthey (JM) plc. Data of several years.

Lifton, J. (2008). 'Can One Man's Actions Take $6 Billion In Value Out of a Minor Metal Market in a Month?'. Hard Assets, August 21. Reprints.

Loferski, P. (2010). 'Platinum Group Metals, Metal Prices in the United States Through 2010'. The U.S Geological Survey.

Platts. Data of several years.

Zois, A., and Zoi, S. (2015). 'The Price of Platinum, Palladium and Rhodium in the International Market Between 2006 and 2012 and the Impact of Economic and Other Factors'. Archives of Economic History, Vol XXVII, Nº 2, July-December, pp. 47–66.

A GEOPOLITICAL APPROACH TO CONCEPTUALIZING AND MEASURING ENERGY SECURITY

J. A. PARAVANTIS* N. KONTOULIS**

Abstract

Energy is an important geopolitical driver, and energy security is an emerging field with growing interest on how it should be measured. This paper contributes to the research literature by providing an in-depth look into the history (since the 20th century), evolution, and dimensions of the concept of energy security. Several definitions, models, and indicators of energy security are reviewed against the backdrop of international relations. Energy security is found to be context dependent, capable of being measured by numerous indicators, with no single accepted methodology being ideal for all historical and geopolitical circumstances. It is concluded that energy security may be measured by acknowledging that it contains multiple components, including: geography, nuclear energy, economy, society, environment policy and political institutions.

JEL Classification: N70, O13, Q48

Keywords: Energy security, energy security indexes, energy security indicators, geopolitics.

1. Introduction

Energy has been essential throughout human history. Energy is an economic, ill-distributed and expensive good, which is subject to considerable price fluctuations with repercussions in many domains of life. Energy is crucial for economic development as well as human security. With energy being the "*precondition of all commodities, a basic factor equal with air, water, and earth*" (E.F. Schumacher, Nobel laureate economist, 1977) and energy services a key to the functioning of modern society, energy security is paramount to human security (Sovacool and Mukherjee, 2011), and has become an

* Associate Professor, Department of International and European Studies, University of Piraeus, Greece, e-mail: jparav@unipi.gr

** Researcher, Department of International and European Studies, University of Piraeus, Greece, e-mail: k.letta@yahoo.gr

increasingly popular concept for policy makers, entrepreneurs and academics, combining the concepts of high and low politics.

Concerns about energy security first arose in the early 1970s in Europe, Japan and USA, at a time when the first oil crises uncovered the vulnerability of developed economies to oil price shocks. The International Energy Agency (IEA) was created in 1974 by the countries included in the Organization for Economic Cooperation and Development (OECD) to promote energy security among its member countries through collective response to physical disruptions of energy supplies, adopting strategies such as holding stocks of at least 90 days of oil net imports.

The global attention to energy security is mostly explained by the new emerging giants of the world economy and their rising energy demand. According to the BP Statistical Review of World Energy, global primary energy consumption increased by 1% in 2016, following a growth of 0.9% in 2015 and 1% in 2014. This compares with the 10-year average of 1.8% a year (BP, 2017). Energy security became a matter of security motivation for most of developed countries in the aftermath of the oil shocks of 1973. The late Kenneth Waltz argued that there is a continuity of strategies of the major western states in energy geopolitics, and he predicted that the oil shocks, provoked by the Arab export embargo, would not cause any change of power in the West (Waltz, 1979).

Energy security is a field dominated by a traditional approach to security and means different things to different countries. The differentiation is based on their geographical location, their natural resource endowment, the status of their international relations, their political system, their economic disposition (Luft and Korin, 2009), and their ideological views and perceptions (Marquina, 2008). The approaches to energy and security may differ between countries depending on the structure of the energy system and historical experiences. This may be clarified by the various strategies chosen by the different member states within the European Union (EU), e.g. the degree of reliance on Russian gas and the diverse historical experiences from the Cold War have led to different approaches to energy security (Leonard and Popescu, 2007, as cited by Johansson, 2013).

The Copenhagen School of security studies has described a multi-level approach to international politics, and distinguishes four main levels: the international (system), the regional (sub-system), the national (unit), and the internal (sub-unit) (De Wilde, 1995). The modern energy systems have been developed into a network of energy interconnections (Johansson, 2013). Hence, energy security needs to be investigated at these four levels: globally, to ensure

adequacy of resources; regionally, to ensure that networking and trade can take place; at country level, to ensure national security of supply and finally at consumer level, to ensure that consumer demand can be satisfied.

This paper: presents a brief history of the evolution of the concept of energy security; compares its definition to that of security; documents the historical approaches in the energy security literature against the backdrop of international relations; places energy security in the context of geopolitics; examines the different components and indicators of energy security; and outlines the role of geographical, energy, economic, societal, environmental, political, and institutional components in the measurement of energy security.

2. A review of the energy security literature

The research literature on energy security is organized around the concept of security, which, whether approached from a realist or a liberal standpoint, is based on similar ontological and epistemological assumptions. Energy security is understood to be closely linked with national security, and greatly influences by fossil fuels particularly oil. It is also closely related to microeconomic and macroeconomic developments (Correlje and Linde, 2006).

Energy security can be divided into security of supply and security of demand (Luft and Korin, 2009) or into physical security (uninterrupted supply), price security and geopolitical security. Much of the literature relates the term energy security to the security of supply (SOS). According to Kruyt et al. (2009), energy security is often used as a synonym for the security of energy supply, particularly by researchers adopting an economic perspective (Johansson, 2013; Jansen and Seebregts, 2010; Keppler, 2007; Le Coq et al., 2009). According to Lefèvre (2007), energy security is related to the security of supply as well as its physical availability. Even if energy security is a term which includes the economic competitiveness of energy, its environmental sustainability and a wide variety of geopolitical issues, the literature usually focuses on the uninterrupted physical availability of energy at an affordable price (Narula and Reddy, 2015).

2.1. A brief history of energy security

Energy security has been an issue for the past century. According to Yergin (1991), Winston Churchill believed that oil supply security was essential to fuel his army during World War I, and was an important concern for Germany and Japan as they invaded the Union of Soviet Socialist Republics (USSR) and

Indonesia during World War II. During these wars, energy security was often implicitly used as a synonym for national security.

According to United Nations (2013) figures, the world energy demand increased from 1676 Million Tons of Oil Equivalent (Mtoe) in 1950 to 4197 Mtoe in 1969. Globally, economic growth, improved living standards, motorization and electrification pushed energy demand in all demand sectors, and the international energy trade increased from 331 Mtoe in 1950 to 1513 Mtoe in 1969. Oil exporting countries formed the Organization of Petroleum Exporting Countries (OPEC) in part to address the distribution of wealth of oil exports. In that period, security of energy supply was not a priority in many developing countries because companies supplied cheap oil and thus stability. At the same time, in many developing countries the majority of the population did not have access to modern energy. For example, in 1969, 72% of the electricity was consumed in OECD countries that had only 20% of the world total population (UN, 2013).

It was during the 1970s that energy security arose as a problem in the research literature. In the first oil crisis in 1973, oil embargoes by the Organisation of Arab Petroleum Countries (OAPEC) shook the oil importing countries to the core, while the second oil crisis shot up international oil prices above $30/barrel (bbl), about $100/bbl in current values (UN, 2013). 1974 was a milestone for the energy security concept: as a response to the 1973 oil embargo, the OECD established the IEA. During that period, international energy security still largely meant oil security. According to IEA (2013) data, in 1979 oil shared as much as 86% of the world energy trade and the Middle East supplied 58% of the internationally traded oil. Consequently, by the end of 1970, energy security was a high priority issue on the policy agenda in view of its significance for the whole economy.

The concern for energy security was reduced in the 1980s, as a result of the supply expansion and the lower demand for energy. Global oil imports decreased by 25% during the first half of the decade. Oil was in part replaced by natural gas and nuclear energy, especially for power generation. According to IEA (2013), while the world energy demand increased by 20% per annum during the 1980s, the share of oil shrank from 42 in 1980 to 37% in 1989 for primary energy supply, and from 20 in 1980 to 12% in 1989 for power generation.

The 1990s were marked by the Gulf War and the collapse of the Soviet Union. Energy security gained momentum after that, when global resources became scarce in the face of a growing global demand for energy. At the time of the first Gulf War (1990-1991) and the dissolution of the Soviet Union (1991), new concepts emerged and the concern for energy security began to

gain prominence in the world's discourse (Yergin, 1988). According to the UN (2013), power demand in non-OECD countries grew much faster than that of the OECD countries, although 63% of electricity was still consumed in OECD countries. Global warming issues were gradually institutionalised throughout the decade. The Kyoto Protocol was signed in 1997 and was the first international treaty to outline emissions targets. Implementation required participating members to create policies and measures to reduce and offset domestic emissions, and increase absorption of greenhouse gases.

As mentioned by Yergin (2006) and Hancock and Vivoda (2014), the energy security issue re-emerged in the 2000s, driven by the rising demand in Asia, disruptions of gas supplies in Europe, and the pressure to decarbonize energy systems. In 2005 the Russian federation cut down the supply of gas to Ukraine on the premise that they were not ready to accept the new prices. As a result, the supply of gas towards western European was also shortened. The Russian-Ukraine crises of 2006 and 2009 showed that the main supplier of the EU, was unreliable and capable of using energy resources as a geopolitical weapon. A more recent revival of interest in energy security was stirred by high oil prices in the period up to 2008, and geopolitical supply tensions (IEA, 2007). At the same time, terror attacks led to the wars in Afghanistan and Iraq. Yet, the Arab Spring and the "Islamic State" have created further tensions and instability. In addition, in 2011 the Fukushima nuclear accident raised important questions about the safety of nuclear energy.

The meaning of energy security has expanded over time. Deviating gradually from the origin of the words that only suggested stable energy flow, the fair price element was added in the 1970s and 1980s. Recently, energy security became closely entangled with other energy policy problems such as providing equitable access to modern energy and mitigating climate change (Goldthau, 2011).

2.2. Defining energy security

When one tries to define energy security, the question of what the term security means in general emerges. The Walzian meaning of security asserts that the issue of security stems from the anarchical structure of society (Waltz, 1979). According to Winzer (2012), the attempts to define energy security have varied over time due to challenges in the realm of energy policy. Different countries may define energy security differently, in relevance to their own energy situation, and their vulnerability to energy supply disruptions. Countries not only differ in their definition of energy security, but also in the way they address energy security challenges (Luft and Korin, 2009).

Several authors (Yergin, 2006; Lefèvre, 2007) point out that the term of energy security is not clearly defined, consequently, there is no universal concept of energy security. Taking into consideration the absence of a clear definition (Kruyt et al., 2009; APERC, 2007; Yergin, 2006), energy security has become an umbrella term for many different policy goals (Winzer, 2012). A multiplicity of concepts and dimensions enter the concept of energy security. Chester (2010) described energy security as "*slippery*" and "*polysemic*". The diversity among the definitions is shaped by the perspective and nature of different countries, and their place in the energy chain and the energy system.

Countries are divided into three groups: producers/exporters, who wish to ensure reliable demand for their commodities; consumers, who commonly aim towards diversity of energy supply, so as to maximize their security; and transit states, who are the essential bridges connecting producers/exporters with their markets (Luft and Korin, 2009). Given the above differentiation among countries, there are two important terms for energy security: security of supply, for the consumers, and security of demand for the exporters. For energy exporting countries, security of demand is equally important to security of supply (Johansson, 2013).

According to Sovacool (2011), there are at least 45 different definitions of energy security that share a great deal of similarity among them, and lead to difficulties in terms of the operationality of the concept. Ang, Choong and Ng (2015) identified 83 energy security definitions in the literature.

As pointed out by Cherp and Jewell (2014), a classic definition of energy security is provided by Yergin (1988), who visualized energy security as the assurance of "*adequate, reliable supplies of energy at reasonable prices*", adding the geopolitical component by qualifying that this assurance must be provided "*in ways that do not jeopardize national values or objectives*". Yergin's definition identifies "*national values and objectives*" as the assets to safeguarding energy security.

The IEA, a pioneer institution in energy security and the most important multinational platform, defines energy security as the "*uninterrupted availability of energy sources at an affordable price*" and considers it to have a long-term and a short-term aspect. The IEA has restated the definition through the years to characterize energy security as adequate, affordable and reliable supply of energy. Long-term energy security relates to "*timely investments to supply energy in line with economic developments and environmental needs*". Short-term energy security relates to "*the ability of the energy system to react promptly to sudden changes in the supply-demand* balance" (Kisel et al., 2016, IEA 2011a; IEA, 2011b).

In 2000 the European Commission (European Commission, 2000) referred to energy supply security as "*the uninterrupted physical availability of energy products on the market, at a price that is affordable for all (private and industrial) consumers, while respecting environmental concerns and looking towards sustainable development*". That was an extension of the IEA definition involving the inclusion of environmental and sustainability issues.

Summing up, definitions of energy security (IEA, 2001, 2007; EC, 2000; APERC, 2007; Yergin, 2006) mainly use the term availability to imply stable and uninterrupted supply of energy. Other authors (Jun et al., 2009; WEC, 2016) use the term reliability for energy infrastructure. Accessibility has been at the center of the energy security debates and policy approaches into the 20th century (Kopp, 2014). As a further extension to the original IEA definition of energy security, the Asia Pacific Energy Research Centre (APERC, 2007) highlighted the four As of availability, affordability, accessibility (to all), and acceptability (from a sustainability standpoint) and defined energy security as "*the ability of an economy to guarantee the availability of the supply of energy resources in a sustainable and timely manner with the energy price being at a level that will not adversely affect the economic performance of the economy*". Cherp and Jewell (2014) compared the 4 As to the five As of access to health care (availability, accessibility, accommodation, affordability and acceptability). The first two (availability and affordability) constitute the classic approach to energy security (20th Century), while the latter two (accessibility and acceptability) reflect certain contemporary concerns (21st Century) e.g. fuel poverty and global climate change.

2.3. Energy security since the 20th century

Chester (2010) and Vivoda (2010) highlight the polysemic and multidimensional nature of energy security. Chester suggested that the term has risen high on the policy agenda of governments because there is a complex system of global markets, a vast cross-border infrastructure networks, and a small group of primary energy suppliers. Manson et al. (2014) have described the energy security as a dynamic concept, with a perspective that depends on the time frame analyzed.

Energy security studies have changed in scope and focus over time, evolving from classic political economy studies of oil supplies for industrialized democracies, to a research field addressing a much wider range of energy sectors and energy security challenges (Cherp and Jewell, 2014). The sources that Cherp and Jewell cite show that, in the 1970s and 1980s, energy security

signified stable supply of cheap oil, and threats to energy security included threats of embargoes, and price manipulation by exporters. Contemporary energy security studies:

- go beyond OECD oil importers
- include nations of all levels of developments (that extract, import and export)
- address perspectives on energy security of non-state actors, including, individual regions, utilities, consumers, and global production networks
- examine a variety of energy sources and carriers
- address environmental issues such as climate change
- address equity issues, mainly providing equitable access to energy
- address a wider range of threats.

Chester (2010) described the energy regime after the World War II, highlighting the following characteristics:

- There was growing dominance of fossil fuels, particularly of Middle Eastern oil (which, in 2008, accounted for one third of world energy use), mainly of the countries comprising the OECD. Oil was cheap until the oil shocks of the 1970s, effectively triggered by the OPEC. Energy security became synonymous with the need to reduce dependence on oil consumption.
- The 1970s economic crisis took place at a time when production was internationalized against a backdrop of rampant inflation, persistently high unemployment, growing government expenditures, declining productivity, shrinking revenues, and smaller profits margins. Accepted management strategies failed to restore the growth of the 1950s and 1960. In the 1980s, the need for the introduction of greater competition and less government involvement was strongly advocated for the electricity, telecommunications, and gas grids, so the energy markets took the path towards restructuring and liberalization. Monopolies were broken up and new pricing schemes were introduced. This restructuring was promoted by the OECD, the World Bank, the International Monetary Fund (IMF), and international trading agreements.
- Nuclear energy was developed rapidly after World War II. By the end of the 1970s, 25 countries were generating electricity from nuclear power (including the USA, the UK, France, Germany, and the former Soviet Union). The public acceptance of nuclear energy was hit by the Three Mile Island (USA, 1979) and the Chernobyl (USSR, 1986) accidents. The growth of nuclear energy was slowed down by high capital costs, lengthy construction times, problems with decommissioning older nuclear plants and disposing their radioactive waste, reactor safety, and concerns about

the potential use to produce nuclear weapons. By 2006, nuclear energy accounted for around 15% of the world's electricity generation, compared to 41% for coal, and 20% for gas. Interestingly, the current climate change debate has rekindled interest in nuclear energy as an energy source that is low in carbon dioxide emissions.

- The emergence of nuclear power reduced the role and geopolitical significance of coal. While oil had become the dominant fuel by 1930, mainly due to its importance in transport, it replaced coal as the industry's primary energy source in the 1950s. In the meantime, the advent of supertankers and the development of pipeline networks lowered the price of oil and natural gas. Gas accounts for about a quarter of global energy consumption, a dominance which has been catalyzed by the development of a global market for Liquefied Natural Gas (LNG). The geopolitical problem is that natural gas resources are concentrated in a handful of countries, with the former Soviet Union and the Middle East holding about three quarters of known world reserves.
- Developing nations are characterized by escalating energy demands. Of these, China and India have emerged as major geopolitical players, key energy consumers, and major energy producers. Interestingly, China's growth has taken place hand in hand with a rapid growth in China's coal consumption, and an increase in the share of coal in world energy use. As of 2017, the cost of coal is comparatively low as oil and natural gas prices have escalated and remain high.
- Political instability in supplier countries, rapidly increasing oil prices, the increasing frequency of disruptions to gas supplied from Russia to Europe, terrorist attacks, and extreme weather events (e.g. the Hurricane Katrina that hit the Gulf coast of the US in 2005) often followed by electricity blackouts, constitute additional energy security risks.

2.4. Energy security and geopolitics

The consequences of the two oil crisis of the 1970s uncovered the degree of vulnerability and dependence on fossil fuel in the industrialized Western world. Conant and Gold (1978) made the first systematic study of energy issues, from a geopolitical perspective, asserting that "*the country having control over resources will control those who rely on the resources, which will lead to a profound transformation of International Relations*".

Energy geopolitics gained momentum after the 1990s, when global resources, mainly fossil fuels, became scarce in the face of growing world demand for

energy. These changes in the global energy geopolitical situation after the Cold War, were documented by Mitchell et al. (1996). The term "*new geopolitics*" was used to reflect factors such as the end of the Cold War, the transformation of the international energy trade by Russian oil and gas resources, and the increase of the importance of natural gas and technology developments.

Despite the fact that the concept of energy security varies across different time periods, it remains central to the study of geopolitics and the global agenda. Esakova (2012) presented the interdependent relationships in the energy sector, as interdependencies between energy producers and energy importers. Due to the interdependence of energy markets and energy prices, energy producers are also highly interconnected among themselves. The same applies to energy importers, who are often forced to cooperate in order to collectively ensure their energy security. Exporting and energy importing states normally have contradictory interests: the first group is interested in the security of energy demand, while the latter seek the security of energy supply.

Vivoda (2010) pointed out the following issues that have made energy security an emerging area of focus in international relations: high energy prices; the increasing demand for geographically concentrated resources; the threat of resource scarcity and depletion in the foreseeable future; and concern for the likely social and political effects of climate change. The concept of energy security is central to the study of geopolitics.

Citing several literature sources, Johansson (2013) suggested that ongoing or potential conflicts over small islands or water areas (such as the South China Sea and the Arctic Region) may be attributed to the existence of valuable energy resources. Furthermore, it is pointed out that US military activities in the Middle East (such as in Iraq) may be motivated by the Carter Doctrine, enunciated by President Jimmy Carter on January 23, 1980: "*An attempt by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States of America, and such an assault will be repelled by any means necessary, including military force.*" (http://www.presidency.ucsb.edu/ws/?pid=33079).

Johansson (2013) has argued that the development of large-scale solar power in North Africa for import to the EU, may create dependencies with security policy implications for Europe. Furthermore, he has suggested that the presence of abundant energy and natural resources in poor countries may create regional insecurity, a phenomenon known as the resource curse.

Citing 2009 BP data, Vivoda (2010) argued that the following 10 largest regional economies consume 61% of the world's energy, producing 54% of the world's Gross Domestic Product (GDP), and emitting 66% of the world's

carbon dioxide (CO_2): United States, Canada, Mexico, Russia, China, India, South Korea, Japan, Australia, and Indonesia. These data show a major geopolitical disconnect: the world's top four oil consumers, China, Japan, India and the US, account for 42% of the world's oil demand, but control only 4% of global oil reserves. Vivoda asserted that energy security concerns among these four major powers have the potential to cause power competition so intense that may translate into open confrontation, especially in the Asia-Pacific region, the world's fastest growing energy consumer and a strategically vulnerable region, of paramount importance for global stability and development. Vivoda also observed that the world's top ten regional economies are characterized by very different energy efficiency and carbon intensity values, citing as examples: Japan being four times as efficient as Russia and four times as efficient as China; the economies of Russia, China and India being five to six times as carbon intensive as Japan; the inefficient use of energy (with a high carbon intensity), creating energy-related pollution in Russia, China and India. Consequently, the growth of energy use in the Asia-Pacific region, particularly in China and India, is likely to have profound impacts on the energy world, and may carry major geopolitical consequences.

2.5. Dimensions of energy security

The historical discourse on energy security has shown that it encompasses a number of dimensions. According to Kruyt et al. (2009), the bulk of the recent literature on energy security seeks to classify energy security concerns into dimensions, even if this classification has been criticized for lacking transparency, being systemically unjustified, and arbitrary (Cherp and Jewell, 2011).

The IEA considers energy security to have three components: reliable and uninterrupted supply; affordable and competitive supply; and accessible or available supply (http://www.iea.org/topics/energysecurity/subtopics/whatisenergysecurity). Furthermore, the IEA has proposed energy security measurement tools of physical availability that account for geopolitical energy security, pipe-based import dependence, power system reliability, and market power (Chester, 2010).

A study by the U.S. Chamber of Commerce (2010) presented four dimensions of energy security: geopolitical (energy imports, particularly from politically unstable regions); economic (high energy intensity and trade imbalances); reliability (adequacy and reliability of infrastructure); and environmental (related to the carbon intensity of the energy systems).

In the words of Cherp and Jewell (2011): "*there are three perspectives on*

energy security, namely those of sovereignty, robustness and resilience". Alhajji (2007) differentiated between six dimensions of energy security: economic, environmental, social, foreign policy, technical and security. Vivoda (2010) listed seven salient energy security dimensions (environment, technology, demand side management, socio-cultural or political factors, human security, international elements like geopolitics, and the formulation of energy security policy) and 44 attributes of energy security.

Sovacool and Mukherjee (2011) consider energy security to comprise five dimensions that may be broken down into 20 components, as follows:

1. Availability: security of supply and production, dependency, and diversification
2. Affordability: price stability, access and equity, decentralization, and low prices
3. Technology development: innovation and research, safety and reliability, resilience, energy efficiency, and investment
4. Sustainability (i.e. environmental component): land use, water, climate change, and air pollution
5. Regulation: governance, trade, competition, and knowledge for sound regulation.

To this end, Sovacool and Mukherjee have assembled 320 simple indicators and 52 complex indicators of energy security.

In a study for the evaluation of energy security in the Asia Pacific and funded by the MacArthur Foundation, Sovacool (2011) listed 20 dimensions of energy security identified by experts. For each dimension (availability, dependency, diversification, decentralization, innovation, investment, trade, production, price stability, affordability, governance, access, reliability, literacy, resilience, land use, water, pollution, efficiency, and greenhouse gas emissions) a number of metrics and indicators was presented.

Putting energy security dimensions into perspective, Radovanović, Filipović and Pavlović (2017) pointed out that it is not possible to develop a unique methodology of assessing energy security because each country has a different wealth of energy resources. The use of these resources differs in: type and intensity at different points of development; climate; geopolitical position; demographic indicators; economic growth; and strategic priorities, which depend on the historical, social and political social conditions (Chester, 2010). Furthermore, Radovanović, Filipović and Pavlović argue that all countries try to improve their energy security by increasing energy efficiency, improving the stability of energy systems, reducing energy vulnerability, and increasing self-sufficiency.

Key energy security models and indicators are reviewed in the next sections.

2.5.1. Energy security models

The IEA Model of Short-Term Energy Security (MOSES) (IEA, 2011), is designed to analyze short-term energy security in IEA member countries, and it functions as a tool to understand the energy security profiles and identify energy policy priorities. The MOSES model looks at resource adequacy, diversity, flexibility, asset performance and sustained emergency events (Kisel et al., 2016). MOSES uses 35 indicators each of which relates to one of the dimensions and is meant to indicate a "*level of risk*" or the "*adequacy of resilience*" of the energy sources under investigation (IEA, 2011a; IEA, 2001b).

The Risk of Energy Availability: Common Corridors for Europe Supply Security model (REACCESS) (REACCESS, 2011) is a unique world model that links three models:

1. the Pan European TIMES multi-regional model (PET36)
2. the global multi-regional TIMES Integrated Assessment Model (TIAM-World)
3. the REACCESS Corridor (RECOR) model, representing the technical-economic details of all "energy corridors" which bring energy from all resource-rich locations to consuming regions.

REACCESS is a large partial equilibrium model of the global energy system representing 51 regions: the 36 countries of PET36 plus the 15 regions of TIAM-World remaining after the EU region is excluded from consideration (REACCESS, 2011).

2.5.2. Energy security indicators

The formulation of energy security dimensions is the first step for the energy security analysis. Nevertheless, these dimensions must be complemented by indicators, which according to Cherp and Jewell (2011), should relate to the dimensions and seek to quantify the energy security risks and concerns identified therein. The aggregation of indicators allows the comparison between energy security risks and identifying policy trade-offs.

Many indicators are available in the literature, based on the perspective of the user (Narula and Reddy, 2015). The literature on the indicators of energy security is quite extensive (Greene, 2010; Coq and Paltseva, 2009; Lefèvre, 2010; Löschel, Moslener and Rübbelke, 2010; Sovacool et al., 2011) and can be a useful tool for monitoring, measuring and evaluating the current and future effects of energy security on the economy, the society and the environment. Indicators for energy security are necessary to link the concept with model-based scenario analyses in the context of addressing policy issues related to affordable energy and climate change (Kruyt et al., 2009).

Chester (2010) suggested that there are quantitative and qualitative approaches to the measurement of energy security. Threats to energy security are short-term (operational) and long-term (related to adequacy of sources, transit, storage and delivery). The literature reviewed by Chester suggests that the quantifiable energy security indicators have the potential of being analytically helpful, and are necessary to assess the consequences of alternative development scenarios.

Various studies (Sovacool et al., 2011; Kisel et al., 2016; Sovacool and Mukherjee, 2011; Radovanović, Filipović and Pavlović, 2017) have proposed a wide variety of energy security indexes, either to compare performance among countries or to track changes in a country's performance over time. In these studies, some indicators are first identified based on specific considerations or theoretical framework. This is followed by data collection, normalization, weighting, and aggregation of the chosen indicators to give one or more composite energy security indexes. A quick review of these studies shows that there are large variations in the choice of indicators (Ang et al. 2015).

Sovacool (2011) defined an index with 20 dimensions and 200 attributes. In subsequent work, Sovacool and Mukherjee (2011) reduced the number of dimensions to five and the number of attributes to 20. Sovacool (2013) applied the index to a set of countries and found that Japan had the highest energy security index among the 18 countries considered. The impact of the Fukushima nuclear accident on Japan's energy system and economy hints at the difficulties that may be encountered when constructing robust energy security indexes.

Ang et al. (2015) reviewed 53 studies that deal with energy security indicators. The number of indicators reviewed in studies varied from a few to more than 60. About two-thirds of the studies employ no more than 20 indicators. The research identified that there are two major types of studies that use energy security indicators: those that deal with performance over time, and those that compare performance among countries with no significant difference in the number of indicators used.

Turning to specific indicators, the Herfindahl-Hirschmann Index determines the degree of a certain country's dependence on a certain supplier, and may be used as an indicator that indirectly points to the energy security of a country (Radovanović, Filipović and Pavlović, 2017). The Supply/Demand Index for the long-term security of supply (SD Index) (Scheepers et al., 2007) has been designed on the basis of expert assessments on all possible relevant aspects of SOS and covers demand, supply, conversion, and transport of energy in the medium to long-term (Kruyt et al., 2009). It is a composite indicator that comprises 30 individual indicators and considers the characteristics of demand,

supply and transport (Radovanović, Filipović and Pavlović, 2017). According to Kruyt et al. (2009), the basic difference with other indicators, is that the SD index attempts to grasp the entire energy spectrum, including conversion, transport and demand (since a decrease in energy use lowers the overall impact of supply disruptions).

The Oil Vulnerability Index (OVI) (Gupta, 2008) is an aggregated index of oil vulnerability based on seven indicators:

- the ratio of value of oil imports to GDP
- the oil consumption per unit of GDP
- the GDP per capita
- the oil share in total energy supply
- the ratio of domestic reserves to oil consumption
- the exposure to geopolitical oil supply concentration risks measured by net oil import dependence, diversification of supply sources, political risk in oil-supplying countries, and the market liquidity.

According to Radovanović, Filipović and Pavlović, (2017), OVI is a more comprehensive composite index that considers certain economic indicators, import dependence, and political stability.

The Vulnerability Index (Gnansounou, 2008) is a composite index which considers five indicators: energy intensity, energy import dependency, ratio of energy-related carbon emissions to the total primary energy supply (TPES), electricity supply vulnerability, and lack of diversity in transport fuels (Radovanović, Filipović and Pavlović, 2017). The Risky External Energy Supply (Le Coq and Paltseva, 2009) is entirely supply-oriented, considers solely the level of diversification, with particular emphasis on the assessment of transport safety of energy generating products (Radovanović, Filipović and Pavlović, 2017).

The Aggregated Energy Security Performance Indicator (AESPI) (Martchamadol and Kumar, 2013) has been developed by considering 25 individual indicators representing social, economy and environmental dimensions. The indicator ranges from zero to 10, and requires time series data for its estimation. The advantages of AESPI is that it not only assists in knowing the past energy security status of a country, but also helps in assessing the future status considering the energy policies and plans of the country, thus enabling the monitoring of the impacts of the policies. The Socio-economic Energy Risk is a composite index that considers the following indicators: energy source diversification, energy resource availability and feasibility, energy intensity, energy transport, energy dependence, political stability, market liquidity, and the GDP (Radovanović, Filipović and Pavlović, 2017).

The US Energy Security Risk Index (US Chamber of commerce, 2010) is a complex composite index obtained based on 83 individual indicators assessing geopolitical indicators, economic development, environmental concerns and reliability (Radovanović, Filipović and Pavlović, 2017). The Energy Development Index (EDI) (IEA, 2011) is composed of four indicators, each of which captures a specific aspect of potential energy poverty:

- per capita commercial energy consumption, which serves as an indicator of the overall economic development of a country
- per capita electricity consumption in the residential sector, which serves as an indicator of the reliability of, and consumer's ability to pay for, electricity services
- share of modern fuels in total residential sector energy use, which serves as an indicator of the level of access to clean cooking facilities
- share of population with access to electricity.

This index was intended as a simple composite measure of the progress of a country or region in its transition to modern fuels, and of the degree of maturity of its energy end use (IAEA, 2005).

The Energy Security Index is composed of two indicators (ESI_{price}, ESI_{volume}) that measure the energy security implications of resource concentration, from the viewpoint both of price and of physical availability (IEA, 2007). ESI_{price} is a composite measure of the diversification of energy sources and suppliers and the political stability of exporting countries, while ESI_{volume} is a measure of the level of dependence of natural gas imports.

In what constitutes an interesting approach, the energy trilemma is defined as balancing the trade-offs between three major energy goals, namely energy security, economic competitiveness, and environmental sustainability (Ang et al. 2015). The dimensions of energy trilemma are defined by WEC (2016) as follows:

- *Energy security*: Effective management of primary energy supply from domestic and external sources, reliability of energy infrastructure, and ability of energy providers to meet current and future demand.
- *Energy equity*: Accessibility and affordability of energy supply across the population.
- *Environmental sustainability*: Encompasses achievement of supply and demand-side energy efficiency, and development of energy supply from renewable and other low-carbon sources.

The Energy Architecture Performance Index (EAPI) was proposed in 2010 by the World Economic Forum (WEF) and was modified the next year into the Energy Sustainability Index (EAPI, 2015). Over the years up until

2015 this index was slightly modified. EAPI is a composite index based on a set of indicators divided into three basic categories (energy security, energy equity and environmental sustainability), the so-called Energy Trilemma Index (Radovanović, Filipović and Pavlović, 2017).

The Energy Trilemma Index, formerly known as the Energy Sustainability Index, was first introduced in 2009, ranking close to 90 countries. This ranking has been expanded to include 130 countries and greater detail about the performance of countries on the specific trilemma dimensions by adding a balance score and an index watch list to give an indication of countries that are expected to display trend changes in the next few years (Ang et al., 2015). The Index 2.0 methodology uses a set of 34 indicators and approximately 100 data sets to rank countries on their trilemma performance (compared to 23 indicators and 60 data sets in the current index methodology) (WEC, 2016).

3. Measuring energy security

In spite of all that has been presented so far, the concept of energy security (and its geopolitical role) is relatively novel, and there are no well-replicated scales for measuring it (Corner et al., 2011). Different approaches to measuring energy security have been developed in the literature (Radovanović, Filipović and Pavlović, 2017), although even the simplest definition ("*the uninterrupted availability of energy sources at an affordable price*" by the IEA) illustrates how complex can any attempt of measurement be.

Measuring energy security helps remove ambiguity from the concept. Oftentimes, energy security focuses on specific energy sources, and talk is made of oil security or coal security. In fact, if one centers on certain aspects of energy supply (such as electricity supply, nuclear power, and gasoline powered automobiles), developing and least developed countries are automatically excluded from consideration since they have poor electricity networks, limited nuclear power units, and non-motorized forms of transport. Another way to go about it, is to consider isolated quantitative variables (such as electricity supply, percent of population with access to electricity, or energy intensity) that are often sectoral in nature, e.g. household energy consumption or share of commercial energy in total energy use. Alternatively, one may estimate composite indicators, such as industrial efficiency, transportation productivity, and environmental quality (Sovacool and Mukherjee, 2011), which are nontrivial to estimate in a meaningful and accurate way.

Cherp and Jewell (2014) have suggested that energy security should be conceptualized as an instance of a more general construct of security. A good basis for approaching security has been provided by the seminal work of

Baldwin (1997), who argued that military, economic, social and environmental instances of security constitute different forms of security, not fundamentally different concepts. Cherp and Jewell suggested that Baldwin makes a distinction between "*acquiring new values*" that is not related to security, and "*protecting existing values*" that lies at the heart of the concept of security.

Vivoda (2010) argued that the classic understanding of energy security is limited, and must be expanded to encompass contemporary factors and challenges, recognizing the fact that energy security is an issue firmly linked with global politics and the relations among nations. According to the same author, there are seven major challenges that must be accounted for, in a contemporary concept of energy security, with a total of 44 attributes of each dimension (considering various quantitative and qualitative attributes of each country):

- *environment*, which constitutes a serious challenge to traditional supply security centered thinking
- *technology*, where a central challenge relates to the creation of a technological base capable of supporting the transition from fossil fuels to alternative and renewable energy sources, against the background of an increasingly technologically intensive society
- *demand-side management*, which is concerned with demand-side risks such as demand surges or large supply capacity surpluses (which may occur, e.g. in a recession)
- *social and cultural factors*, such as the NIMBY type of opposition from local communities or social movements, which make the siting of important infrastructure (such as large power plants) problematic
- *human security*, which goes beyond the requirement for a state to be energy independent, and covers issues such as providing access to basic energy services to all population (related to fuel poverty)
- *international implications*, such as whether a state is committed to global cooperation on energy related issues such as climate change agreements or regional energy security cooperation
- *existence of energy security policies*, which underscore the capacity and commitment of a state to achieve such a target.

Furthermore, Vivoda (2010) gives examples of employing these dimensions and attributes to compare countries:

- Japan would likely score high in fossil fuel demand reduction (achieved by conservation and substitution policies)
- western liberal democracies such as the US, Canada and Australia, would score higher on sociocultural risks related to NIMBY behavior, compared to more authoritarian states such as Russia and China

- regional countries would score low on commitment to regional and international cooperation on energy-related issues.

In the next sections, a number of components that should be taken into account in the formulation of an energy security indicator are discussed.

3.1. Geographical components

According to Correlje and van der Linde, (2006), the geographic distribution of oil, gas and coal reserves should be considered. Furthermore, the location of a country in an oil producing area such as the Middle East, Russia, the Caspian, the Persian Culf, and Africa, should be represented, possibly by indicator variables. In particular, even though the Middle East has vast gas resources, the political climate is not much better than Russia and the Caspian Sea, as far as investments are concerned.

3.2. Energy components

Coal and nuclear power will continue to play an important role in the energy mix, to offset dependence on imported gas (Correlje and van der Linde, 2006), so the contribution of each energy source to the energy mix of each country should be considered. The oil consumption growth and the investments to construct new or replace existing production capacity should also be among the data that will be collected and subject to analysis. Strategic coal, oil and gas reserves as well as the ratio of reserves to production of the present as well as e.g. 40 and 60 years in the future, should also be taken into consideration.

Given that the US purchases crude oil from over 60 different countries (Correlje and van der Linde, 2006), a work researching energy security should keep track of the number of countries that a country purchases oil, gas, and coal from. This, together with the fact that much of global oil production originates in countries that are characterized by internal instability, points towards the direction of possibly defining appropriate energy fragility variables.

3.3. Nuclear energy components

The incorporation of a nuclear energy component in an energy security indicator seems obvious, since nuclear power can be an economical and reliable way of generating large amounts of base load electricity without producing CO_2. With nuclear power, the marginal cost of electricity is low, but construction, decommissioning, and waste disposal costs are high (WEC, 2016). A

total of 31 countries already have nuclear power and a number of them, including India and China, are looking to build new nuclear power units, while 20 countries are reported to be looking to develop nuclear power (World Nuclear Association, 2017).

As pointed out by Corner et al., (2011), the long-time association of nuclear energy with destroying powers and world-making, sets nuclear apart from other technological systems in the mind of the public, what Masco (2006) calls the "*nuclear uncanny*". In the words of Winzer (2012): "*For some people the goal of energy security is the reliable provision of fuels and the role of nuclear energy is one of enhancing security. For others, energy security is concerned with a reduction of hazards from accidents and proliferation and the expansion of the nuclear industry is a potential threat to energy security*". Corner et al. (2011) argue that public attitudes towards nuclear energy constitute a reluctant acceptance (Bickerstaff et al., 2008) that should be interpreted against the following background: (a) high levels of awareness and concern about climate change, coupled with (b) an emerging concern about energy security (which remains poorly defined). Nuclear energy has been viewed as a potential method of addressing these two issues since the late 1990s (Teravainen et al. 2011), yet there is a clear preference for renewable energy over fossil fuels, as sources for electricity generation.

3.4. Economic components

Energy security is and will continue to be an issue because of the ongoing relevance and inertias associated to energy in contemporary economies. As a consequence many countries have energy security as a major priority in their energy policies.

Probably the most important element that is included in all definitions of energy security is the availability of energy to an economy Kruyt et al. (2009). Energy security is often implicitly used as a synonym for security of supply, particularly by researchers applying an economic perspective such as Kruyt et al., (2009) and Johansson (2013). In this fashion, energy security is closely related to micro and macroeconomic developments (Correlje and van der Linde, 2006). Some thoughts on economic variables that could be taken into account in an energy security indicator now follow.

A minimum supply of energy is essential for the functioning of an economy, thus energy security is and will continue to be an issue (Labandeira and Manzano, 2012). The cost of energy is an important factor in the inflation rate as well as in the competitive position of the economy of a country (Correlje

and van der Linde, 2006). On the relationship between energy prices and energy consumption, Radovanović, Filipović and Pavlović (2017) has argued that when energy prices increase, the consumption does not decline, while when energy prices decrease, energy consumption increases significantly. On the affordability of energy prices, Deese (1979), as cited by Cherp and Jewell (2014), writes that affordable prices do not cause "*severe disruptions of normal social and economic activity*".

Consuming countries wish to keep energy prices low (as long as does not remove incentives for the development of supply), while producing countries gain when prices are high (as long as they do not cause big reductions in demand) (Johansson, 2013). Imports from OECD and non-OECD countries should be tallied (Correlje and van der Linde, 2006). Investments as well as Foreign Direct Investments (FDS) in the oil, gas and coal industry could be taken into account too (Correlje and van der Linde, 2006).

The existence and number of independent bilateral agreements with producer countries as well as the economic instability could be indicated (by dummy or quantitative variables) (Correlje and van der Linde, 2006), possibly including quantitative measures of economic instability as well. As an example, in countries like Nigeria, there are conflicts over economic rents and oil exploitation, which in turn cause political and social rivalry (Correlje and van der Linde, 2006) that should be accounted for in any research aiming to develop an energy security indicator.

3.5. Societal components

The attitudes of society towards the use of alternative energy sources should be accounted for in an energy security index. Corner et al. (2011) argue that high concern about energy security (as a foreign policy issue) was found in a summary of international public opinion (by the World Council on Foreign Relations), with significant support for energy conservation and investment in renewable energy sources. The same authors cite a UK national survey that indicated a high degree of support for government subsidies of renewable energy technologies as well as attaining energy independence. Of the renewable energy sources, solar and wind power appear to be perceived favorably as being able to deliver reliable and secure energy (Reiner, 2006).

3.6. Environmental components

Although air pollution became a big concern in industrialized countries during

the 1950s, 1960s and 1970s, global warming and awareness of climate change remained low. In the 1980s, the World Health Organization (WHO) found the Intergovernmental Panel on Climate Change (IPCC) to provide a scientific view of climate change. In 1997, the Kyoto Protocol was signed to set binding obligations on industrialized countries to reduce emissions of greenhouse gases. In 2011 a new value was included in the basic definition of energy security by IEA, the "*respect for environmental concerns*". All in all, there is no doubt that environmental concerns should be accounted for, in any definition of energy security.

3.7. Political and institutional components

Organizations that should be considered in the context of energy security are the World Trade Organization (WTO), IEA, OPEC, and IMF. Relevant regional free trade organizations include the European Union (EU), the North American Free trade Agreement (NAFTA), the Southern Common Market (MERCOSUR), and the Southern African Development Community (SADC) (Correlje and van der Linde, 2006).

Although the US maintains a transatlantic relationship with the EU cooperating on issues of energy security, at the same time it discourages independent EU energy initiatives, e.g. the Euro-Arab dialog that took place in the 1970s. Political difficulties should be taken into account in the development of an energy security indicator, with possible interactions with oil producing country (Correlje and van der Linde, 2006).

The ability of a country to develop its own means of deterrence and the actual deterrence capacity both relate to energy security. The case of Iraq, a central player in the global energy landscape, show that an indicator variable showing whether a country is a failed state, should be incorporated in the political component of any energy security research. Competition for scarce resources between consumer countries will cause conflict, so there is a risk that key producing regions slip into chaos – this should also be accounted for.

The presence of a centralist political structure, lack of effective political institutions, and a weak civil society are also indicator variables that should be considered. The presence of elites, and the concentration of bigger amounts of wealth in smaller portions of the society, should also be considered. Taking corruption into account is important because large oil and gas revenues generate political pressures and corruption (Correlje and van der Linde, 2006).

4. Conclusions

Energy is an important geopolitical driver, and energy security is an emerging field with growing interest on how it should be measured. This paper contributed to the research literature by providing an in-depth look into the history, alternative definitions, and the components of energy security.

Differences among studies were observed in the way definitions are framed and indicators are constructed. Energy security was shown to be a multidimensional concept, taking into account geographical, nuclear energy, economic, social, environmental, political and institutional components.

Acknowledgments

The authors are indebted to Professor Emeritus Constantinos Zois for his invaluable suggestions on both content and form. The authors also acknowledge Drs. T. Nadasdi and S. Sinclair for their online Spell Check Plus (http://spellcheckplus.com) that was used for proofing the entire manuscript

References

Alhajji, A. F. (2007). 'What is energy security? Definitions and concepts'. Middle East Economic Survey, L, 45.

Ang, B. W., Choong, W. L., and Ng, T. S. (2015). 'Energy security: Definitions, dimensions and indexes'. Renewable and Sustainable Energy Reviews, 42, pp. 1077–1093.

Asia Pacific Energy Research Center (APERC) (2007). A quest for energy security in the 21st century: Resources and constraints. Japan: Asia Pacific Energy Research Center. Retrieved from http://aperc.ieej.or.jp/file/2010/9/26/APERC_2007_A_Quest_for_Energy_Security.pdf.

Baldwin, D. A. (1997). 'The concept of security'. Review of International Studies, 23, 5–26. Retrieved from https://www.princeton.edu/~dbaldwin/selected%20articles/Baldwin%20(1997)%20The%20Concept%20of%20Security.pdf.

Bickerstaff, K., Lorenzoni, I., Pidgeon, N. F., Poortinga, W., and Simmons, P. (2008). 'Reframing nuclear power in the UK energy debate: Nuclear power, climate change mitigation, and radioactive waste'. Public Understanding of Science, 17, pp. 145–169.

British Petroleum (BP) (2017, June). BP statistical review of world energy. 66th ed., UK. Retrieved from https://www.bp.com/content/dam/bp/en/

corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-full-report.pdf.

Cherp, A., and Jewell, J. (2011). 'The three perspectives on energy security: Intellectual history, disciplinary roots and the potential for integration'. Current Opinion in Environmental Sustainability, 3(4), pp. 202–212.

Cherp, A., and Jewell, J. (2014). 'The concept of energy security: Beyond the four As'. Energy Policy, 75, pp. 415–421.

Chester, L. (2010). 'Conceptualising energy security and making explicit its polysemic nature'. Energy Policy, 38, pp. 887–895.

Conant, M., and Gold, F. (1978). The geopolitics of energy. Boulder, Colorado, USA: Westview Press.

Corner, A., Venables, D., Spence, A., Poortinga, W., Demski, C., and Pidgeon N. (2011). 'Nuclear power, climate change and energy security: Exploring British public attitudes'. Energy Policy, 39, pp. 4823–4833.

Correlje, A., and van der Linde, C. (2006). 'Energy supply security and geopolitics: A European perspective'. Energy Policy, 34, pp. 532–543.

De Wilde, J. (1995). 'Security levelled out: the Dominance of the Local and the Regional'. In Dunay, P., Kardos, G., and Williams, A. (eds), New Forms of Security: Views from Central, Eastern and Western Europe, Dartmouth, 88.

Deese, D. A. (1979). 'Energy: economics, politics, and security'. International Security, 4(3), pp. 140–153.

Esakova, N. (2012). European energy security. Analysing the EU-Russia energy security regime in terms of interdependence theory. Frankfurt, Germany: Springer.

European Commission (EC) (2000). 'Towards a European strategy for the security of energy supply'. Green Paper, Luxembourg: Office for Official Publications of the European Communities.

Gnansounou, E. (2008). 'Assessing the energy vulnerability: case of industrialized countries'. Energy Policy, 36, pp. 3734–3744.

Goldthau, A. (2011). 'Governing global energy: existing approaches and discourses'. Current Opinion in Environmental Sustainability, 3(4), pp. 213–217.

Greene, D. (2010). 'Measuring energy security: Can the United States achieve oil independence?' Energy Policy, 38, pp. 1614–1621.

Gupta, E. (2008). 'Oil vulnerability index of oil-importing countries'. Energy Policy, 36, pp. 1195–1211.

Hancock, K. J., and Vivoda, V. (2014). 'International political economy: a field born of the OPEC crisis returns to its energy roots'. Energy Research and Social Science, 1, pp. 206–216.

International Energy Agency (IEA) (2007). Energy security and climate policy: assessing interactions. Paris: IEA/OECD.

International Energy Agency (IEA) (2010). World energy outlook 2010. Paris: International Energy Agency.

International Energy Agency (IEA) (2011a). 'The IEA Model of Short-term Energy Security (MOSES)'. Primary Energy Sources and Secondary Fuels, Working Paper, International Energy Agency.

International Energy Agency (IEA) (2011b). Measuring short-term energy security. Paris, France: OECD/IEA. Retrieved from https://www.iea.org/publications/freepublications/publication/Moses.pdf.

International Energy Agency (IEA) (2013). World Energy Outlook 2013. Paris, France: OECD/IEA. Retrieved from https://www.iea.org/publications/freepublications/publication/WEO2013.pdf.

Jansen, J. C., and Seebregts, A. J. (2010). 'Long-term energy services security: what is it and how can it be measured and valued?' Energy Policy, 38(4), pp. 1654–1664.

Johansson, B. (2013). 'A broadened typology on energy and security'. Energy, 53, pp. 199–205.

Jun, E., Kim, W., and Chang, S.H. (2009). 'The analysis of security cost for different energy sources'. Applied Energy, 86(10), pp. 1894–1901.

Keppler, J. H. (2007). International relations and security of energy supply: Risks to continuity and geopolitical risks. Paris, France: University of Paris-Dauphine. Retrieved from http://www.europarl.europa.eu/RegData/etudes/etudes/join/2007/348615/EXPO-AFET_ET(2007)348615_EN.pdf.

Kisel, E., Hamburg, A., Harm, M., Leppiman, A., and Ots, M. (2016). 'Concept for Energy Security Matrix'. Energy Policy, 95, pp. 1–9.

Kopp, S. D. (2014). Politics, markets and EU gas supply security. Case studies of the UK and Germany. Berlin, Germany: Springer. Retrieved from http://www.springer.com/gp/book/9783658083236.

Kruyt, B., van Vuuren, D. P., de Vries H. J. M., and Groenenberg H. (2009). 'Indicators for energy security.' Energy Policy, 37, pp. 2166–81.

Labandeira, X., and Manzano, B. (2012). 'Some economic aspects of energy security'. WP09/2012. Retrieved from https://eforenergy.org/docpublicaciones/documentos-de-trabajo/WP092012.pdf.

Le Coq, C., and Paltseva, E. (2009). 'Measuring the security of external energy supply in the European Union'. Energy Policy, 37, pp. 4474–81.

Lefèvre, N. (2007). Security and climate policy: assessing interactions. Paris: OECD/ International Energy Agency.

Leonard, M., and Popescu, N. (2007). A power audit of the EU-Russia relations. London, UK: European Council on Foreign Relations.

Löschel, A., Moslener, U., and Rübbelke, D. T. G. (2010). 'Indicators of energy security in industrialised countries'. Energy Policy, 38, pp. 1665–71.

Luft, G., and Korin, A. (2009). 'Energy security: In the eyes of the beholder'. In Energy security challenges for the 21st century: A reference handbook, Luft, G., and Korin, A. (eds), Santa Barbara, California, USA: Praeger Security International.

Manson, A., Johansson, B., and Nilsson, L. J. (2014). 'Assessing energy security: An overview of commonly used methodologies'. Energy, 73, 1–14.

Marquina, A. (2008). 'The southeast–southwest European energy corridor'. In Energy security: Visions from Asia and Europe, Marguina A. (ed.), UK: Palgrave Macmillan, pp. 54–68.

Martchamadol, J., and Kumar, S. (2013). 'An aggregated energy security performance indicator'. Applied Energy, 103(C), pp. 653–70.

Masco, J. (2006). The nuclear borderlands: The Manhattan Project in post-cold war New Mexico. Princeton, New Jersey, USA: Princeton University Press.

Mitchell, J., Beck, P., and Grubb, M. (1996). The New Geopolitics of Energy. London: The Royal Institute of International Affairs.

Narula, K., and Reddy S. (2015). 'Three blind men and an elephant: The case of energy indices to measure energy security and energy sustainability'. Energy, 80, pp. 148–158.

Radovanović, M., Filipović S., and Pavlović, D. (2017). 'Energy security measurement – A sustainable approach'. Renewable and Sustainable Energy Reviews, 68, pp. 1020–1032.

Reiner, D. M. (2006). EPRG Public opinion survey on energy security: Policy preferences and personal behaviour. Retrieved from http://www.eprg.group.cam.ac.uk/wp-content/uploads/2008/11/eprg0706.pdf.

Scheepers, M., Seebregts, A. J., De Jong, J. J., and Maters, J. M. (2007). EU standards for security of supply. Hague: Energy Research Center (ECN)/ Clingendael International Energy Programme.

Sovacool, B. K., Mukherjee, I., Drupady I. M., and Agostina A. A. L. (2011). 'Evaluating energy security performance from 1990 to 2010 for eighteen countries'. Energy, 36, pp. 5846–5853.

Sovacool, B. (2011). 'Evaluating energy security in the Asia pacific: Towards a more comprehensive approach'. Energy Policy, 39, pp. 7472–7479.

Sovacool, B. K., and Mukherjee, I. (2011). 'Conceptualizing and measuring energy security: A synthesized approach'. Energy, 36, pp. 5343–5355.

Teravainen, T., Lehtonen, M., and Martiskainen, M. (2011). 'Climate change, energy security and risk - debating nuclear new build in Finland, France and the UK'. Energy Policy, 39, pp. 3434–3442.

U.S. Chamber of Commerce (2010). Index of U.S. Energy security risk: Assessing America's vulnerabilities in a global energy market. U.S. Chamber of Commerce: Washington D.C.

Vivoda, V. (2010). 'Evaluating energy security in the Asia-Pacific region: A novel methodological approach'. Energy Policy, 38, pp. 5258–5263.

Waltz, K. (1979). Theory of International Politics. Addison-Wesley series in political science, Reading, Massachusetts, USA: Addison-Wesley.

Winzer, C. (2012). 'Conceptualizing energy security'. Energy Policy, 46, pp. 36–48.

World Energy Council (WEC) (2016). 'World Energy Trilemma I 2016. Defining Measures to Accelerate the Energy Transition'. London, UK: WEC. Retrieved from https://www.worldenergy.org/wp-content/uploads/2016/05/World-Energy-Trilemma_full-report_2016_web.pdf.

World Nuclear Association (2017, September). Emerging Nuclear Energy Countries. Retrieved from http://www.world-nuclear.org/information-library/country-profiles/others/emerging-nuclear-energy-countries.aspx.

Yergin, D. (1988), 'Energy security in the 1990s'. Foreign Affairs, 67(1), pp. 110–132.

Yergin, D. (1991). The Prize: The Epic Quest for Oil, Money, and Power. New York, New York, USA: Simon and Schuster.

Yergin, D. (2006). 'Ensuring Energy Security'. Foreign Affairs, 85(2), pp. 69–82.

EMPLOYEES' BEHAVIOR IN THE GREEK MUTUAL FUND INDUSTRY

G. G. KAKALETRI*

Abstract

Despite its obvious importance, little empirical evidence is available regarding behavioural patterns of employees working in the mutual fund sector. This study provides evidence that (1) employees, in order to be effective, adapt distinct behaviour, according to the department they are working for, and (2) the overall behavior of employees isn't differentiated between mutual fund management companies and, also, it isn't influenced by their personal/demographic profile. The job's specific requirements, in an environment like the mutual fund industry, is the unified factor for the employees' behavior, regardless of their particular personal background (like gender, age, marital status, studies, etc.). This is one of the first studies attempting to examine the personal characteristics (e.g. the behavior), not only for mutual fund mangers, but also for employees working in other departments, like marketing, accounting, etc.

JEL Classification: D23, L2

Keywords: Behaviour, Human Capital, Mutual Fund Management Companies

1. Introduction

Employees are one of the most valuable assets of an organization. When employees adapt the proper behavior this means that they are effective, which can result to increased customer satisfaction. Satisfied customers lead to customer loyalty, increasing the profits and market share. According to Bacon (2004) any behavior that can differentiate a company is above average, because it goes beyond customers' expectations. Employees with superior interpersonal skills (i.e. sociability, openness with sharing feelings, interest in other people, etc.) can better handle the reactions and emotions of customers (Bacon, 2004). Likewise employees with altruistic behavior help an organization to function effective (Rosopa et al., 2013). Hence, achieving behavioral advantage demands hiring the right people that adapt the proper behavior in the workplace. Furthermore, the participative managerial behavior (i.e. focus on individuals, teams, relationships between work groups and the relationship of

* Department of Business Administration, University of Piraeus, e-mail: gkakaletri@yahoo.gr.

all of these to the organizational mission) is a key element in the organizational transition (Albers Mohrman and Lawler, 1988, p.58).

In selecting and recruiting the personnel, an organization wants to hire people that have the right abilities in order to achieve business objectives (Thomas, 1990, p.13). Furthermore, the picture of an organization is influenced from the behavior and abilities of its employees. Hence, attracting and retaining the best people is something that investors keep in mind when judging the value of a company (Michlitsch, 2000, p.29).

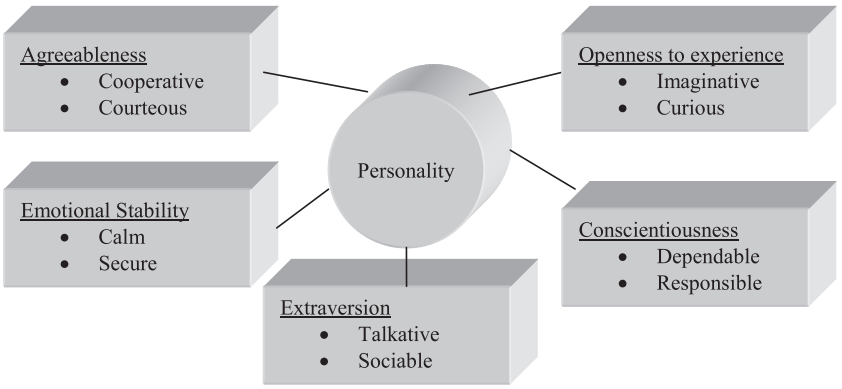
2. Employees' Behavior in the Workplace

Behavior is any form of human action (Adler and Gundersen, 2008, p.20). Organizational behavior is "*the study of human behavior in the workplace, the interaction between people and the organization with the intent to understand and predict human behavior*" (Hiriyappa, 2009, p.3). According to Hellriegel and Slocum (2009, p.36) behavior always includes the complex interaction between the person and the situation, e.g. the surrounding environment strongly influences the way people behave at a certain time. Employees' behavior in a company is impacted from (1) group norms, expectations, and cohesiveness, (2) organizational culture, organizational procedures, and organizational structure and (3) the performance of the organization in the marketplace (Sims, 2002).

In studying the behavior of employees in organizations, it is important to focus on the link between personality and behavior. Personality is "*a relative stable set of psychological attributes that distinguishes a person from another*" (Griffin and Moorhead, 2010, p.61). Personality represents certain characteristics that lead to consistent patters of behavior (Hellriegel and Slocum, 2009, p.36). Personality psychologists, after many years of research, have concluded that the dimensions that can describe human personality are: emotional stability, agreeableness, extraversion, conscientiousness, and openness (Griffin and Moorhead, 2010, p.61; Champoux, 2010, p.112; Hellriegel and Slocum, 2007, p.46) (Figure 1).

Several researches indicated that there exists a relationship between personality factors and job performance, indicating that employees who are responsible, dependable, persistent, and achievement oriented achieve better results (Hellriegel and Slocum, 2007, p.47). The dimensions of personality are essential in managing the behavior of employees in an organization. Tosi et al. (2000) suggest that prevailing personalities in the workplace shape the organizational culture.

Figure 1: The Big Five Personality Dimensions



Source: Champoux JE. (2010). *Organizational Behavior: Integrating Individuals, Groups, and Organizations.* (4th ed.). New York: Taylor & Francis, p.112.

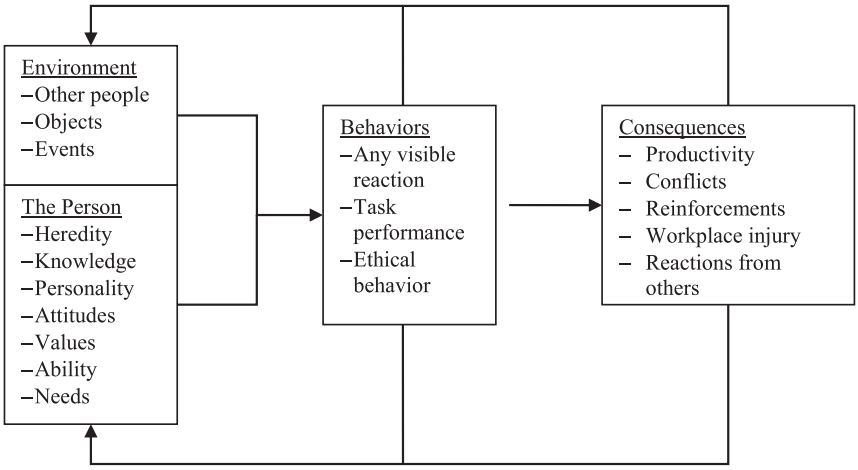
In addition, the behavior of employees is a function of the person and the environment (Tosi and Mero, 2003, p.4):

$$B = f(P, E)$$

Tosi and Mero (2003) suggest that the environment encompasses everything that can influence the behavior of a person. The environment interfaces with the main characteristics of a person, influencing together its behavior. The behavior being, finally, adapted by employees has some consequences (intended or not) that can effect the organization. In addition, a person can learn from its behavior and consequences and make any changes that are necessary in his behavior and/ or in the environment in order to reduce any negative outcomes in the future (Figure 2).

According to Sulea et al. (2012) job and personal characteristics differentially predict organizational behavior. Employees' behavior at work is a combination of (1) their choice to participate in organizational activities, teams, not to be absent, etc. and (2) their decision how to behave at work (Cascio and Boudreau, 2010). If the environment, i.e. the organization, offers the right incentives and motivates employees, this means that the behavior they will choose to adapt will be for the benefit of the organization. Employees'

Figure 2: Basic Model of Human Behavior



Source: Tosi H, Mero N. (2003). *The fundamentals of organizational behavior: What managers need to know*. Oxford: Blackwell Publishing, p.5.

behavior affects the organizational results, since it has been observed that not proper behavior leads to reduced performance (Fournies, 2000, p.217).

Employees are a vital part for every organization, no matter in which sector an organization operates. Without their involvement nothing can be realized, no plan or procedure. Human resources belong to the intangible assets of an organization that are hard to be imitated or copied by competitors, because they posses certain nonmaterial characteristics. Employees' behavior is one of the most important intangible characteristics. Behavior can lead a company to the top or failure. Thus, it is important to focus on the dimensions of behavior that are being adapted in the workplace by employees, and not to ignore their multiple impact on organizational results.

3. Employees' Behavior in the Greek Mutual Fund Management Companies

Human resources are a crucial factor for the analysis of financial markets and shouldn't be ignored. One of the most important reasons why investors choose a mutual fund is past track record. Therefore, it comes as no surprise

that there is a wealth of literature on mutual fund performance and about mutual fund managers themselves (Bogan et al., 2013; Kaushik et al. 2010; Christoffersen and Sarkissian, 2009; Gil-Bazo and Ruiz-Verdu, 2008; Switzer and Huang, 2007; Maditinos et al. 2007; Gottesman and Morey, 2006; Golec, 1996).

Despite its obvious importance, little empirical evidence is available regarding the behavior of all employees working in the mutual fund sector. All of the above mentioned studies focus on mutual funds or mutual fund managers. None of them has examined employees that work in other departments (like marketing, accounting, etc.), besides mutual fund managers. This is one of the first studies attempting to examine the personal characteristics (e.g. the behavior) and demographic profile, not only for mutual fund mangers, but for the total of employees working in a mutual fund management company. Hence, the purpose of this paper is to investigate the behavior of employees working in mutual fund management companies in Greece.

It would be interesting to research the employees' behavior of companies that are preferred by customers over other companies. Thus, to investigate the behavior of employees that work in companies that posses big share of the market. Do the human resources of these companies adapt the same behavior? If yes, what dimensions of behavior are being adapted from employees that work in companies that are famous and successful in the Greek mutual fund industry? This is something that the present paper attempts to study.

According to Kusluvan (2003, p.39) employees' personality is considered to influence organizational performance, indirectly through employees' performance. Furthermore, there is a strong link between human resource management systems, policies/practices and organizational effectiveness through their effects on employees' behavior (Kusluvan, 2003, p.40). A good measure for organizational effectiveness is the market share. Thus, the bigger the market share of a company, the bigger its effectiveness. The market share expresses an approximate view of a company's sales performance in relation to the total market (Bragg, 2007, p.281). Between market share and awareness there exist a positive relationship (Woodside, 1996, p.18). This means that investors choose the mutual fund company to invest according to their brand awareness.

On the basis of the above rationale, the behavior of employees of the three largest Greek mutual fund management companies, who are equally dominant and capture, approximately, 80% of the Greek market, was analysed by developing an assessment tool, through the combination of two established ones. The Greek mutual fund industry has a peculiar characteristic: the market share is concentrated in three Greek mutual fund management companies. Knowing that these companies are famous and competing with each other, it would be

interesting to study the behavior of their employees and see what behavior is being adapted according to specific job characteristics and if the behavior is differentiated among these three highly successful companies.

The individual is the starting point of organizational effectiveness (Hellriegel and Slocum, 2009, p.6). In order to work effectively all employees must have completely understood what is expected from them, what are the job requirements, how they must behave in order to meet the specific goals of their position and adjust to the organizational culture. Organizational Citizenship behavior may be the competitive edge that can make an organization to be differentiated and excel above its competitors (Kusluvan, 2003, p.258), because it includes all relevant positive behaviors of individuals within an organization (Barroso Castro et al., 2004, p.29). Graham (1991, p.255) suggested that organizational citizenship behavior encompasses the following three categories of behavior:

1. Organizational Obedience (e.g. respect for rules and regulation, task completion, etc.)
2. Organizational Loyalty (e.g. cooperate with others to serve the interests of the whole, contribute to the reputation of the organization, etc.)
3. Organizational Participation (e.g. attending meetings, sharing ideas with others, etc.)

Furthermore, according to Herman et al. (1975) the organizational structure characteristics play an important relationship to employees' responses. In this respect, the behavior of employees working in the three biggest mutual fund management companies shouldn't be differentiated. These companies possess almost the same market share, they have similar organizational structure and their activities are restricted from the same legislative and regulatory framework. Thus, we predict that:

H1: The behavior of employees between the three equally dominant Greek mutual fund management companies isn't differentiated.

Employees' perceptions of their organization affects how they adjust to their job requirements (Wilson et al., 2004).The findings of the study of Rousseau (1978) supported that job characteristics account for a big part of the relationship of departmental characteristics to attitudes and behavior. Hackman and Lawler (1971) found that employees react differently to different job descriptions. The study of Su-Fen and Hsiao-Lan (2005) showed that job variety and job significance had a significant positive relationship with organizational citizenship behavior.

Considering the results of previous studies, when examining the behavior of employees working in different departments there should be noticed a difference. Since every department has different requirements from the other

departments of the company, it is assumed that employees working in the same department must have the same skills, abilities and adapt the same behavior in order to meet the goals of the department they work for. In this respect, the following hypothesis is formulated:

H2: Employees that work in the same departments adapt distinct, differentiable behavior.

Finally, the behavior of a person can evolve over time as it becomes exposed to new experiences and situations (Hellriegel and Slocum, 2009, p.46). The results of the study of Herman et al. (1975) showed that the profiles of organizational structure and demographic characteristics were related to employee responses. Also, Burke et al. (2009) found differences in personal demographic and work situation characteristics. So it is assumed that the behavior of employees that work in mutual fund management companies can be differentiated according to the background, the experiences, and the life style of a person. Thus, we predict that:

H3: Employees' behavior is differentiated according to their personal/demographic profile (gender, age, marital status, educational institution, studies, tenure in the organization and experience).

4. Survey

Sampling

This survey examines the behavior of employees working in the Greek mutual fund sector. Our source, in order to determine the sample (e.g. the Greek mutual fund management companies), was the database of the "Association of Greek Investment Companies and Mutual Fund Management Companies".

There are 22 Mutual Fund Management Companies operating in Greece. In our research the Companies with the highest market share in Greece were selected. Therefore, our analysis is based upon the three biggest Mutual Fund Management Companies (total market share: 78.69%). The market shares of any of the rest Investment Companies were smaller than 5%, and were not included in our research. Thus, our sample consists of the three biggest companies in Greece, which have almost equal individual market shares.

In order to collect data and ensure a high response rate, our research was conducted with the support of the CEOs of each company. A total of 175 employees participated, providing a high response rate (71%). The data were collected from March until June 2008.

Questionnaires

In our research two questionnaires were used. The first questionnaire is the Personal Profile System – DISC Model (Copyright 1989, Performax Systems International Inc., Copyright 1997, Rev.1979 Systems International Inc./ Hellenic Management Association), which was developed by the psychologist William Moulton Marston (1928). Its popularity increased during the '70s when John Geier built on Marston's work and developed the DISC Model which is marketed by Performax International Systems (Pace, 2002). This inventory has been used by over 40 million people (Reid and Reid, 2003; Beamish, 2005) and by many authors (Cooper, 2000; Aldisert, 2000; Beamish, 2005; Reid and Reid, 2003; Bamber and Castka, 2006; McKenna et al., 2002; Reynierse et al., 2000; Mellor et al., 2002; Aamodt, 1982; Furlow, 2000; Slowikowski, 2005; Aamodt and Kimbrough, 1982a; Aamodt and Kimbrough, 1982b; Jones, 1980). Personal Profile System describes behavior based on how people view themselves.

The Personal Profile System analyses a person according to its score in the following 4 dimensions of behavior (Aamodt, 1982; Beamish, 2005; Reid and Reid, 2003):

- **Dominance (D):** Obtains immediate results, accepts challenges, makes quick decisions, takes authority, solves problems, and is strong-willed.
- **Influence (I):** Creates a motivational environment, inspires enthusiasm, energizes others, shares ideas, helps others, makes a favourable impression, participates in teams.
- **Steadiness (S):** Performs in consistent and predictable ways, is patient, concentrates on the task, listens carefully, is faithful.
- **Compliance (C):** Concentrates on details, checks for accuracy, complies with authority, and thinks critically.

The dimension, that receives the highest score, is considered to be the main behavioral style of an individual. Each dimension (D, I, S, C) can be viewed based on three frameworks:

- (I): Expected Behavior
- (II): Spontaneous Reaction under Pressure
- (III): Self-Perception

Framework I is comprised of adjectives that *mostly* describe an individual's behavior, Framework II is comprised of adjectives that describe *less* an individual's behavior and Framework III is a linear combination of Frameworks I and II.

With the help of Personal Profile System the three categories of behavior that encompass some of the characteristics of organizational citizenship behavior according to Graham (1991) can be measured, i.e. the organizational obedience, loyalty and participation can be measured with the dimensions of

behavior *Compliance*, *Steadiness* and *Influence*. Being able to study the categories of behavior that encompass some characteristics of the organizational citizenship behavior, can help us in the present study to determine if this kind of behavior is adapted by employees in the most successful companies of the mutual fund. Furthermore, mutual fund management companies require people to obtain immediate results and accept challenges. This dimension of behavior can be measured with *Dominance.* Hence, employees in the sector should be able to make quick decisions, share ideas, help others, concentrate on the task, check for accuracy and comply with authority. All these attributes can be examined with the help of the Personal Profile System. Thus, different personality types can be determined with the help of the Personal Profile System. It can determine employees' behavior styles at work, facilitate planning changes in order to increase effectiveness, and, finally, it can increase the acceptance of others' work styles (Jones, 1980). In addition, the Personal Profile System can help employees to determine which dimension of behavior they use in a specific situation (Beamish, 2005, p.139). This instrument focuses on behavior and not on attitudes or feelings (Jones, 1980, p.508). The Personal Profile System can hep a person to (1) discover behavioral strengths, (2) value the strengths of others, (3) adapt behavior according to a specific situation, (4) improve communication skills and (5) reduce conflict (Reid and Reid, 2003, p.96).

Overall, the Personal Profile System is a tool which can help employees in the workplace to know themselves, invest in their strengths, modify their behavior to suit the situation, and not to mimic behavioral styles that aren't themselves (Reid and Reid, 2003, p.98).

The second questionnaire is based upon the Transactional Analysis Theory. Transactional Analysis was introduced in the early 1960s by Eric Berne as a way of examining communication (McKay et al., 2009, p.89). Transactional Analysis Theory complements the Personal Profile Systems, since the emotions, the rational thought and the prejudices of people are being considered in the analysis.

According to Transactional Analysis Theory, every person has three ego states, which are separate and distinctive sources of behavior: the Parent Ego State, the Adult Ego State and the Child Ego State (Schaeffer, 2009 p. 43). An Ego State is defined as a consistent pattern of feelings and experiences relating to corresponding, consistent pattern of behaviors (Barker, 1980, p.6; Stewart and Joines, 1987, p.15). The Ego States have been studied and analyzed by many authors/researchers (Boen and Fryd, 1978; Ersnst, 1971; Pointdexter 1972; Fox, 1975; Thomspon, 1976; Gillespie, 1976; Helman and Austin, 1977; McLain and Kruse, 1980; Landheer, 1981; Steere, 1981; Jacobs, 2000; Loffredo *et al.*, 2002, Hine, 2005; Drego, 2006; Schmid, 2008).

The *Parent* Ego State reflects all the attitudes and behaviors which have been copied from parental figures at the early stages of a person's life (Hayes, 2002, p.295). It is the part of a person (in relation to itself and others) that keeps traditions, sets limits and rules, gives advice, criticises, consults, protects and nurtures (McKay et al., 2009, p.90; Barker, 1980, p.6).

The *Adult* Ego State makes decisions upon facts and objective evaluation of data/ information. The "Adult" does not behave based on its emotions, but upon what is the more appropriate and useful thing to do in each circumstance (Stewart, 2005, p.496).

The *Child* Ego State reflects the emotions and impulsive reactions which are similar to the emotions and impulsive reactions of a child (Cameron, 1999, p.309). Expressions of the Child Ego State are the emotions of joy, fear, anger, etc. This Ego State can be a source of creativity and spontaneous reaction (Steiner, 1990, p.28). It is the centre of a person's feelings and emotions (Barker, 1980, p.7).

The Questionnaire used in our research (Josien et al., 1995) examines the following subcategories of the three Ego States (Josien et al., 1995; Teale et al., 2003; Gregoire and Jungers, 2007): (1) **Parent**: (a) *Nurturing Parent,* who is supportive, helpful, protects and comforts and (b) *Critical Parent,* who is critical, gives orders and punishes, (2) **Adult**, who reacts based on logic and knowledge, and (3) **Child:** (a) *Free Child,* who is spontaneous, without considering the consequences of its actions and rules, but has, also, potentially ingenuity *(b) Adapted Child,* who is compliant and conforms to the rules and wishes of the parent ego state, and *(c) Rebellious Child*, who objects, doesn't comply and doesn't give up easily.

Employees that work in mutual fund management companies must be rational and not make judgments based on prejudices and emotions. This aspect of behavior can be analyzed with the help of Transactional Analysis Theory. In addition, the Transactional Analysis Theory can be a valuable tool in assessing the human behaviour, because it focuses on emotions. According to Hellriegel and Slocum (2009, p.51) people tend to behave in ways that are consistent with their feelings. Transactional Analysis Theory tests consistent pattern of feelings and experiences relating to corresponding, consistent pattern of behaviors. In addition, Transactional Analysis Theory examines both productive as well unproductive expressions of emotions. Productive expressions of emotions are positive emotions. Positive emotions have been linked to organizational effectiveness (Hellriegel and Slocum, 2009, p.58). Positive emotions allow people to focus on their jobs, be more productive and co-operative, while negative emotions distract people from work.

Personality profile questionnaires can be very useful in order to identify strengths and weaknesses in specific job requirements (Melamed and Jackson, 1995, p.14). They help to define behavioral strengths and to adjust the behavior according to certain circumstances and situations. Both instruments that were used in the present analysis are not tests. Participants don't pass or fail. Their objective is to determine the intensiveness of each dimension of behavior.

5. Data Analysis

Employees in the Greek Mutual Fund Industry

The characteristics of the sample respondents are provided in Table 1. Forty eight percent of the employees are women and fifty two percent men. The average age of an employee is 36 years old while the majority is married (53%).

Regarding their educational level, the majority holds a university degree (79%) and most of the employees have graduated from business schools (Business Administration: 29%, Finance: 21%, Economics: 17%).

The average job experience is 13 years, while the average tenure in the mutual fund management company is 7 years. The majority of respondents is managing Mutual Funds (32%) and the rest is employed in accounting (27%), administrative services (15%), marketing (9%), information technology (IT) (7%), customer service and support networks (7%), and conformity and agreement of actions (3%).

Factor Analysis

In order to identify causal factors from the combined use of the two tools, Factor Analysis was used. The SPSS 15.0 statistical package was employed using as a factor extraction method the "Principal Component Analysis" to obtain the minimum number of factors needed to explain the variability in the original set of data (Ho, 2006, p.204). The "Varimax with Kaiser Normalization" rotation method was used, analyzing the correlation matrix. Our approach to handle the missing data was to substitute the variable mean for all missing values, because the alternative methods (Listwise and Pairwise) can result in a lost of power (Harrington, 2009, p.39). Furthermore, for the Personal Profile System the analysis was conducted only for Frameworks I and II in order to avoid multicollinearity problems.

Pre-analysis testing for the suitability of the sample for factor analysis was conducted through the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's Test of Sphericity (Table 2).The value of KMO

Table 1: Characteristics of Employees in the Mutual Fund Industry

	Mean
Gender (%)	
Female	48
Male	52
Age (years)	36
Marital Status (%)	
Married	53
Not Married	47
Education (%)	
University Degree	79
Major (%)	
Business Administration	29
Finance	21
Economics	17
Informatics	10
Statistics	5
Accounting	3
Other Studies	15
Total Experience (years)	13
Tenure in the Organization (years)	7
Department of Employment in the Organization (%)	
Mutual Funds Management	32
Accounting	27
Administrative Services	15
Marketing	9
Information Technology (IT)	7
Customer Service & Support of Networks	7
Conformity & Agreement of Actions	3

is acceptable when it is greater than 0.6 (Pallant, 2007, p.185; Brace et al., 2006, p.318). The Bartlett'sTest of Sphericity is conducted in order to evaluate whether a correlation matrix is suitable for factor analysis by testing the hypotheses that the matrix is an identity matrix (Munro, 2005, p.336). As shown in Table 2, the KMO value is greater than 0.6, while in the Bartlett's Test of Sphericity ($p = 0.0$) the hypotheses Ho is rejected, indicating that the sample was suitable for factor analysis.

For the extraction of factors the Kaiser's criterion was employed, upon which factors with eigenvalue <1 are not taken into consideration (Enders, 2004, p.91; Field, 2009, p.788). This criterion is accurate if the number of variables is less than 30 and the mean value of communalites is greater than 0.70 (Stevens, 2002, p.390; Bryman and Cramer, 1990, p.260), which is the case in our analysis (Table 3). Furthermore, the communality of a variable is considered as acceptable, if its value is greater than 0.50 (Hair et al., 1998, p. 113).

Table 2: Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and the Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.627
Bartlett's Test of Sphericity	Approx. Chi-Square	996.583
	df	91
	Sig.	.000

Table 3: Communalites

	Initial	Extraction
Nurturing Parent	1.000	.768
Critical Parent	1.000	.729
Adult	1.000	.794
Free Child	1.000	.712
Adapted Child	1.000	.632
Rebellious Child	1.000	.578
I.Dominance	1.000	.771
I.Influence	1.000	.743
I.Steadiness	1.000	.768
I.Compliance	1.000	.594
II.Dominance	1.000	.821
II.Influence	1.000	.748
II.Steadiness	1.000	.602
II. Compliance	1.000	.674

Extraction Method: Principal Component Analysis.

Upon this criterion, a total of 5 factors where determined, which explain 70.96% of the total variance of all variables (Table 4). This percentage is acceptable. According to Hair et al. (1998, p.104) in social sciences this percentage should be higher than 60%.

The factors extracted in our analysis are shown in Table 5. Generally, the loadings below 0.3 or 0.4 are used as a cut off point (Hinton et al., 2004. p.347). It is useful to rerun the analysis setting a lower value to ensure that some variables are not missed (Field, 2005, p.647). We rerunned the analysis using a lower value than 0.3, e.g. 0.28, noticing that a new variable is included in the 4th factor.

Table 4: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumula-tive %	Total	% of Variance	Cumula-tive %	Total	% of Variance	Cumulative %
1	4.548	32.486	32.486	4.548	32.486	32.486	3.382	24.157	24.157
2	1.860	13.283	45.769	1.860	13.283	45.769	2.430	17.360	41.517
3	1.227	8.762	54.531	1.227	8.762	54.531	1.531	10.932	52.450
4	1.218	8.697	63.227	1.218	8.697	63.227	1.348	9.629	62.079
5	1.082	7.731	70.958	1.082	7.731	70.958	1.243	8.879	70.958
6	.790	5.645	76.603						
7	.658	4.697	81.300						
8	.632	4.514	85.814						
9	.594	4.245	90.059						
10	.459	3.275	93.334						
11	.408	2.913	96.247						
12	.326	2.330	98.577						
13	.114	.817	99.394						
14	.085	.606	100.000						

Extraction Method: Principal Component Analysis.

Table 5: Results of Factor Analysis

	Component				
	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**
II.Dominance	-.853				
I.Dominance	.807				
I.Steadiness	-.702	-.489			
Rebellious Child	.655			-.289	
II.Steadiness	.622	.390			
II.Compliance	.618	.436			
I.Influence		.845			
II.Influence		-.843			
Critical Parent			.839		
I.Compliance			.659		
Adult				.861	
Adapted Child			.332	-.611	
Nurturing Parent					.844
Free Child	.333	.508			.570

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 7 iterations.

In order to determine a factor, at least 3 variables are required (rule of thumb) (Jensen, 2006, p.139; Bray, 1982, p.17). Since, the last factor encompasses the variable "Nurturing Parent", which doesn't appear in any other factor; we decided not to exclude the last factor from our analysis.

According to table 5, the following factors are derived:

1. The first factor is positively loaded by Dominance, Rebellious Child and Free Child, and negatively loaded by Steadiness and Compliance. This factor can be labeled as **Dynamic**, characterizing people who are dynamic, enthusiastic and energetic.

2. The second factor is positively loaded by Influence and Free Child, and negatively loaded by Steadiness and Compliance. This factor can be labeled as **Sociable**, characterizing people who express their feelings and like contact with other people.

3. The third factor is positively loaded by Critical Parent, Compliance, and Adapted Child. This factor can be labeled as **Formal**, characterizing people who stick to rules and procedures.

4. The fourth factor is positively loaded by Adult and negatively loaded by Adapted and Rebellious Child. This factor can be labeled as **Rational**, characterizing people who behave objectively, rationally and not emotionally.

5. The fifth factor is positively loaded by Nurturing Parent and Free Child. This factor can be labeled as **Supportive**, characterizing people who guide other people with a genuine, honest and flexible manner.

Results

In this section the results regarding our hypothesis testing are presented. The significance values of Kolmogorov-Smirnov one-sample test suggest that all factors are normally distributed (Table 6). Our analysis will be conducted applying the t-test and ANOVA.

Table 6: Kolmogorov-Smirnov Test (Factors)

		Dynamic	Sociable	Formal	Rational	Supportive
N		175	175	175	175	175
Normal Parameters (a.b)	Mean	.0000000	.0000000	.0000000	.0000000	.0000000
	Std. Deviation	1.00000000	1.00000000	1.00000000	1.00000000	1.00000000
Most Extreme Differences	Absolute	.032	.055	.046	.100	.067
	Positive	.031	.029	.028	.050	.039
	Negative	-.032	-.055	-.046	-.100	-.067
Kolmogorov-Smirnov Z		.419	.732	.611	1.317	.892
Asymp. Sig. (2-tailed)		.995	.658	.849	.062	.404

a Test distribution is Normal.
b Calculated from data.

Table 7 shows the results of ANOVA for the mutual fund management companies. The research hypothesis H1 was not supported for the factor "*Rational*" ($F = 5.122, p < 0.05$). Thus, the behavior of employees in the Greek mutual fund management companies is only differentiated for the factor "*Rational*".

Regarding the research hypothesis H2 (e.g. employees that work in the same departments adapt distinct behavior), three out of the results for the five factors (Table 7) indicated a statistical significant difference, e.g. in the factors dynamic ($F = 3.007$, $p = 0.008$), sociable ($F = 2.848$, $p = 0.011$) and formal ($F = 2.632, p = 0.018$).

In Table 8 for the factors dynamic, sociable and formal, the departments with their corresponding means are presented.

Employees working in specific corporate departments can be differentiated upon their dynamism, sociability and formality. For instance, Mutual Fund Managers who often face difficult investment decisions, should be more dynamic than employees working in the Accounting department. Likewise, sociability is more apparent in Customer Service and Support of Networks, where the department must communicate and serve customers (internal and external), while this behavior is not vital for Administrative Services. Similarly, the emphasis in rules and procedures is more important for the "Conformity and Agreement of Actions" department than for Marketing, where creativeness is considered as more significant.

On the contrary, rationality and supportiveness are type of behaviors that aren't decisive for the differentiation of employees working in different corporate departments. Thus, the adoption of rational attitude is essential and it

Table 7: Results of Anova

	Educational Institution		**Studies**		**Mutual Fund Management Companies**		**Corporate Department**	
	F	**Sig.**	**F**	**Sig.**	**F**	**Sig.**	**F**	**Sig.**
Dynamic	.376	.770	.497	.809	.348	.707	3.007	.008
Sociable	1.193	.316	.301	.935	1.487	.229	2.848	.011
Formal	.372	.773	1.771	.116	.424	.655	2.632	.018
Rational	.730	.536	1.130	.353	5.122	.007	.755	.607
Supportive	1.188	.318	.374	.893	1.183	.309	1.024	.411

Table 8: Ranking of the Means for the Factors "Dynamic", "Sociable" and "Formal" among Departments

Dynamic	**Rank**	**Mean**
Mutual Funds Management	1	0.347
Marketing	2	0.300
IT	3	0.168
Customer Service & Support of Networks	4	0.110
Administrative Services	5	-0.298
Conformity and Agreement of Actions	6	-0.327
Accounting	7	-0.329
Sociable		
Customer Service & Support of Networks	1	0.725
Conformity and Agreement of Actions	2	0.639
Marketing	3	0.434
Accounting	4	0.048
IT	5	-0.073
Mutual Funds Management	6	-0.227
Administrative Services	7	-0.266
Formal		
Conformity and Agreement of Actions	1	0.505
Customer Service & Support of Networks	2	0.447
Accounting	3	0.301
IT	4	-0.020
Mutual Funds Management	5	-0.147
Administrative Services	6	-0.178
Marketing	7	-0.561

is considered as given in the workplace, while all individuals are often supportive towards colleagues, encouraging them, no matter in which department they work.

Regarding the research hypothesis H3 following results are derived: tables 9-10 report the results of t-test for gender and marital status, and table 7 shows the results of ANOVA for educational institution and studies. In all cases the corresponding $p > 0.05$, indicating that there doesn't exist a statistical significant difference. Table 12 presents the results of the correlation analysis for the factors, age, tenure in the organization and total experience (the correlation analysis was conducted with the use of Spearman coefficient, because the results of Kolmogorov-Smirnov Test (Table 11) suggested that the variable "Tenure" is not normally distributed). There doesn't exist a correlation between the (1) factors and (2) age, tenure in the organization and total experience ($p>0.01$). The research hypothesis H3 wasn't supported, providing evidence that employees' behavior isn't influenced from their personal/ demographic profile. Furthermore, the correlation analysis (Table 12) showed that between the factors doesn't exist any correlation ($p>0.01$).

Table 9: T-Test (Results for Gender)

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Dynamic	1.757	156	.081	.27517224	.15659731
Sociable	-1.701	156	.091	-.26775670	.15736902
Formal	.285	156	.776	.04697667	.16468648
Rational	-.457	156	.648	-.07269568	.15890501
Supportive	-.385	156	.701	-.06062664	.15736153

Table 10: T-Test (Results for Marital Status)

	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Dynamic	.716	151	.475	.11453116	.16007072
Sociable	-1.143	151	.255	-.18442827	.16132163
Formal	.278	151	.781	.04691701	.16863399
Rational	-.882	151	.379	-.14331170	.16248993
Supportive	.369	151	.712	.05875515	.15905327

Table 11: Kolmogorov-Smirnov Test (Results for Age, Tenure, Total Experience)

		Age	Tenure	Total Experience
N		145	141	138
Normal Parameters(a,b)	Mean	36,12	7,0668	12,9692
	Std. Deviation	6,104	5,80842	6,12681
Most Extreme Differences	Absolute	,069	,134	,074
	Positive	,064	,134	,051
	Negative	-,069	-,115	-,074
Kolmogorov-Smirnov Z		,831	1,591	,870
Asymp. Sig. (2-tailed)		,495	,013	,436

a Test distribution is Normal.
b Calculated from data.

Table 12: Correlation Analysis

			Age
Spear-man's rho	Age	Correlation Coefficient	1.000
		Sig. (2-tailed)	.
		N	145
	Tenure	Correlation Coefficient	.513(**)
		Sig. (2-tailed)	.000
		N	135
	Total Experience	Correlation Coefficient	.806(**)
		Sig. (2-tailed)	.000
		N	134
	Dynamic	Correlation Coefficient	-.045
		Sig. (2-tailed)	.592
		N	145
	Sociable	Correlation Coefficient	.017
		Sig. (2-tailed)	.837
		N	145
	Formal	Correlation Coefficient	-.030
		Sig. (2-tailed)	.724
		N	145
	Rational	Correlation Coefficient	-.058
		Sig. (2-tailed)	.490
		N	145
	Supportive	Correlation Coefficient	-.012
		Sig. (2-tailed)	.888
		N	145

** Correlation is significant at the 0.01 level (2-tailed).

Tenure	Total Experience	Dynamic	Sociable	Formal	Rational	Supportive
.513(**)	.806(**)	-.045	.017	-.030	-.058	-.012
.000	.000	.592	.837	.724	.490	.888
135	134	145	145	145	145	145
1.000	.626(**)	-.133	.054	.052	-.037	-.042
.	.000	.116	.527	.541	.661	.621
141	133	141	141	141	141	141
.626(**)	1.000	-.041	.132	.011	-.012	.020
.000	.	.634	.122	.897	.892	.812
133	138	138	138	138	138	138
-.133	-.041	1.000	.001	-.015	-.001	.009
.116	.634	.	.990	.839	.988	.905
141	138	175	175	175	175	175
.054	.132	.001	1.000	-.012	-.034	.045
.527	.122	.990	.	.874	.656	.551
141	138	175	175	175	175	175
.052	.011	-.015	-.012	1.000	-.038	-.021
.541	.897	.839	.874	.	.615	.779
141	138	175	175	175	175	175
-.037	-.012	-.001	-.034	-.038	1.000	-.036
.661	.892	.988	.656	.615	.	.638
141	138	175	175	175	175	175
-.042	.020	.009	.045	-.021	-.036	1.000
.621	.812	.905	.551	.779	.638	.
141	138	175	175	175	175	175

6. Discussion

Practical Implications and Research Contribution

The goal of the present study was to examine the behavior of employees in the Greek mutual fund sector. The study was conducted by developing an assessment tool, through the combination of two established ones: the Personal Profile System and Transactional Analysis Theory Questionnaire.

This is one of the first studies that attempts to analyze employees' point of view, and, specifically, the behavior they adapt in the most successful companies in the Greek mutual fund sector. According to several researches there is a relationship between personality and job performance (Barrick and Mount, 1991; Tett et al., 1991). Thus, the present study attempted to see if there are specific behaviors that are being adapted by employees that work in the most successful companies of the mutual fund industry. The recruitment of candidates in a company and the decision of employees to continue to work in a company are not accidental. According to Bergiel et al. (2009), in order not to quit, employees consider if they fit in a job position, as well as their relationships with other people working in the company. Employees, that adapt a behavioral style that fits the job requirements, are more productive, are more likely to enjoy the job, focus their energy on job competition and have less stress than their colleagues that don't fit the job requirements (McKenna et al., 2002).

The findings of this study supported our first research hypothesis for all factors except for one. Hence, the behavior of employees in the Greek mutual fund management companies, basically, isn't differentiated. The only differentiation was in the factor "Rational". Furthermore, the second research hypothesis, e.g. employees that work in the same corporate departments adapt distinct behavior was supported in our analysis in three out of five factors. Corporate departments can be differentiated upon their dynamism, sociability and formality. The rational and supportive behavior is a prerequisite for a goal team, so it is not surprising that the behavior of employees isn't differentiated. Our third research hypothesis, e.g. employees' behavior is influenced from their personal/ demographic profile (gender, age, marital status, educational institution, studies, tenure in the organization and experience) was not supported.

For the interpretation of the results, the characteristics of the Greek mutual fund market can't be overlooked. The largest market share in Greece is composed (with about equal dominance) by three companies (total share of market 78.69%) belonging in banking groups. In addition, all mutual fund

management companies in our analysis are influenced from the overall strategy of the group they belong to, e.g. the Greek banks. Thus, their services don't differ very much, while they have similar size. Furthermore, the regulation in the mutual fund market is quite strict, thus, increasing the similarity of practices and services offered. Hence, the total behavior of employees isn't differentiated, as well as their personal/ demographic profile is similar and doesn't differentiate their behavior. In addition, people are attracted to and select organizational situations they prefer to enter. As similar people are attracted and dissimilar people leave, the organization becomes more homogenous (Tosi et al., 2000, p.39).

Bhatti et al. (2013) suggest that managers should consider personality traits while recruiting personnel. The selection of the right person for the right job/ department, ensures that employees adapt the proper behavior according to the needs of a job position. This study provides evidence that (1) employees, in order to be effective, adapt distinct behavior, according to the department they are working for, and (2) the overall behavior of employees isn't differentiated between the (three equally dominant) most successful Greek mutual fund management companies. The job's specific requirements, in an environment like the mutual fund industry, are the unified factor for the employees' behavior, regardless of their particular personal background (like gender, age, marital status, studies, etc.). Hence, the behavior being adapted by employees in the most successful mutual fund management companies, basically, isn't differentiated. This finding indicates that employees' behavior between the largest mutual fund management companies is similar.

The adoption of the desired behaviors in the workplace can contribute to the success of the organizations. As Harrison et al. (2006) point out, positive attitudes in the workplace don't withheld employees from their work roles, leading to the desired organizational results. In addition, the behavioral style of employees in the workplace is so important, that employers seek to assess the behavior style of candidates together with the job interview (McKenna et al., 2002, p.319).

Being able to know what dimensions of behavior are effective, means that a company can control the effects of employees' behavior adaptation in the workplace by (1) selecting persons that can adapt the right behavior in the workplace, (2) recruiting people that can meet the goals of their job requirements, and (3) educating employees in order to adapt the proper behavior. Knowing what dimensions of behavior are important means that the company can select only the people that fit to the organizational culture and meet the company's goals. Even one person can be a source of disadvantage for a

company, if it doesn't contribute to organizational effectiveness through his behavior.

To provide a service to customers (investors) with complete freedom of choice raises issues about the personal commitment and input of employees (Reid and Reid, 2003, p.97). According to Beamish (2005, p.144) it is more important to equip people with a wide set of thinking skills and a few core behaviors than to concentrate on knowledge and a list of core competences.

Limitations and Future Research

Several limitations constrain the interpretation and application of the findings. First, our analysis is based upon the three biggest Mutual Fund Management Companies, which total market share is 78.69%. The market shares of the other Mutual Fund Management Companies were smaller than 5% and, therefore, were not included in our research. Thus, our sample consists of the three biggest companies in Greece, which have a similar market share. Second, the CEOs and general managers didn't participate in the study, limiting the results to the behavior adapted from employees of the corporate departments. Future studies could explore the behavior of CEOs and general managers, since they are the ones who shape and give direction to implement the corporate strategy. Third, the human behavior is multidimensional. Its dimensions aren't constrained by the components of behavior studied in this research. Conducting research with other behavioral inventories can determine other aspects of the human behavior. Furthermore, this particular research is focused in the Greek mutual funds market that has the peculiarity of the centered market dominance by three companies. Thus, a different market segmentation may result in different outcomes. Hence, it would be interesting to conduct the same research in a market that is bigger or smaller or similar to the Greek mutual fund industry to see whether there are similarities and/or differences.

References

Aamodt, M. (1982). 'Personality Predictors of Performance in an Introductory Computer Course'. Journal of Data Education, 22 (4), pp. 31–35.

Aamodt, M., and Kimbrough, W. (1982a). 'Validity Considerations in Acceptance of Personal Profile System Interpretations'. Educational and Psychological Measurement, 42, pp. 625–628.

Aamodt, M., and Kimbrough, W. (1982b). 'Effect of Group Heterogeneity on Quality of Task Solutions'. Psychological Reports, 50, pp. 171–174.

Aamodt, M., Kimbrough, W., Keller, R., and Neufeldt, D. (1982).

'Psychometric Properties of the Personal Profile System', paper presented at the annual meeting of the Southwestern Psychological Association, Dallas: Texas.

Adler, N.J., and Gundersen, A. (2008). International dimensions of organizational behaviour. (5th ed.). Mason, OH: South-Western Cengage Learning.

Albers Mohrman, S., and Lawler, E.E. (1988). 'Participative Managerial Behavior and Organizational Change'. Journal of Organizational Change Management, 1 (1), pp. 45–59.

Aldisert, L. (2000). 'What is Your Communication Style?'. Bank Marketing, 32 (10), pp. 46.

Bacon, T. (2004). 'You are How you Behave: Customers can't be fooled'. Journal of Business Strategy, 25 (4), pp. 35–40.

Bamber, D., and Castka, P. (2006). 'Personality, organizational orientations and self-reported learning outcomes'. Journal of Workplace Learning, 18 (2), pp. 73–92.

Barker, D. (1980). TA and Training. Hampshire: Gower.

Barrick, M., and Mount, M. (1991). 'The big five personality dimensions and job performance'. Personnel Psychology, 44 (1), pp. 1–26.

Barroso Castro, C., Martín Armario, E., and Martín Ruiz, D. (2004). 'The influence of employee organizational citizenship behavior on customer loyalty'. International Journal of Service Industry Management, 1, pp. 27–53.

Beamish, G. (2005). 'How chief executives learn and what behaviour factors distinguish them from other people'. Industrial and Commercial Training, 37 (3), pp. 138–144.

Bergiel, E., Nguyen, V., Clenney, B., and Taylor, G. (2009). 'Human Resource Practices, Job Embeddedness and Intention to Quit'. Management Research News, 32 (3), pp. 205–219.

Bhatti, M.A., Kaur, S., and Battour, M., (2013). 'Effects of individual characteristics on expatriates' adjustment and job performance'. European Journal of Training and Development, 37 (6), pp. 544–563.

Boen, J., and Fryd, D. (1978). 'Six-State Transactional Analysis in Statistical Consultation'. The American Statistician, 32 (2), pp. 58–60.

Bogan, V., Just, D., Dev, C. (2013). 'Team gender diversity and investment decision-making behavior'. Review of Behavioral Finance, 5 (2), pp. 134–152.

Brace, N., Kemp, R., and Snelgar, R. (2006). SPSS for Psychologists: A Guide to Data Analysis Using SPSS for Windows. (3rd ed.). Hampshire: Palgrave Macmillan.

Bragg, S. (2007). Business ratios and formulas: a comprehensive guide. New Jersey: John Wiley and Sons.

Bray, N.W. (1982). International Review of Research in Mental Retardation, 22, San Diego: Academic Press.

Bryman, A., and Cramer, D. (1990). Quantitative Data Analysis for Social Scientists. London: Routledge.

Burke, R., Koyuncu, M., and Fiksenbaum, L. (2009). 'Gender differences in work experiences, satisfactions and wellbeing among physicians in Turkey'. Gender in Management: An International Journal, 24 (2), pp. 70–91.

Cameron, R. (1999). Acting Skills for Life. Canada: Dundurn Press Ltd.

Cascio, W.F., and Boudreau, J.W. (2010). Investing in People: Financial Impact of Human Resource Initiatives. New Jersey: FT Press.

Champoux, J.E. (2010). Organizational Behavior: Integrating Individuals, Groups, and Organizations. (4th ed.). New York: Taylor and Francis.

Christoffersen, S., and Sarkissian, S. (2009). 'City Size and Fund Performance'. Journal of Financial Economics, 92 (2), pp. 252–275.

Cooper, E. (2000). 'D.I.S.C. Drives', Financial Planning, 30 (9), pp. 107–110.

Drego, P. (2006). 'Freedom and Responsibility: Social Empowerment and the Altruistic Model of Ego States'. Transactional Analysis Journal, 36 (2), pp. 90–104.

Enders, A. (2004). Management Competence: Resource-Based Management and Plant Performance. Heidelberg: Physica.

Ersnst, F. (1971). 'The Diagrammed Parent: Eric Berne's Most Significant Contribution'. Transactional Analysis Journal, 1 (1), pp. 49–58.

Field, A. (2005). Discovering Statistics Using SPSS. (2nd ed.). London: SAGE.

Field, A. (2009). Discovering Statistics Using SPSS. (3rd ed.). London: SAGE.

Fournies, F. (2000). Coaching for improved work performance. New York: McGraw-Hill Professional.

Fox, E. (1975). 'Eric Berne's Theory of Organizations'. Transactional Analysis Journal, 5 (4), pp. 345–353.

Furlow, L. (2000). 'Job Profiling: Building a Winning Team Using Behavioral Assessments'. Journal of Nursing Administration, 30 (3), pp. 107–111.

Gil-Bazo, J., and Ruiz-Verdu, P. (2008). 'When Cheaper is Better: Fee Determination in the Market for Equity Mutual Funds'. Journal of Economic Behavior & Organization, 67 (3-4), pp. 871–885.

Gillespie, J. (1976). 'Feelings in the Adult Ego State'. Transactional Analysis Journal, 1 (1), pp. 69–72.

Golec, J.H. (1996). 'The Effects of Mutual Fund Managers' Characteristics on Their Portfolio Performance, Risk and Fees'. Financial Services Review, 5 (2), pp. 133–148.

Gottesman, A.A., and Morey, M.R. (2006). 'Manager Education and Mutual Fund Performance'. Journal of Empirical Finance, 13, pp. 145–182.

Graham, J. (1991). 'An essay on organizational citizenship behaviour'. Employee Rights and Responsibilities Journal, 4 (4), pp. 249–70.

Gregoire, J., and Jungers, C. (2007). The Counselor's Companion: What Every Beginning Counselor Need to Know. Mahwah: Lawrence Erlbaum Associates.

Griffin, R.W., and Moorhead, G. (2010). Organizational Behavior: Managing People and Organizations. (9th ed). Mason: South-Western Cengage Learning.

Hackman, J.R., and Lawler, E.E. (1971). 'Employee reactions to job characteristics'. Journal of App. ied Psychology, 55 (3), pp. 259–286.

Hair, J.F., Anderson, R.E., Tatham, R.L., and Black, W.C. (1998). Multivariate Data Analysis. (5th ed.). Upp. r Saddle River: Prentice Hall.

Harrington, D. (2009). Confirmatory Factor Analysis. New York: Oxford University Press.

Harrison, D., Newman, D., and Roth, P.L. (2006). 'How Important are Job Attitudes? Meta-Analytic Comparisons of Integrative Behavioral Outcomes and Time Sequences'. Academy of Management Journal, 49 (2), pp. 305–325.

Hayes, J. (2002). Interpersonal Skills at Work. New York: Routledge.

Hellriegel, D., and Slocum, J. (2007). Organizational behaviour. (11th ed.). Mason: Thomson South Western.

Hellriegel, D., and Slocum, J. (2009). Organizational behaviour. (12th ed.). Mason: Southwest Cengage Learning.

Helman, D., and Austin, V. (1977). 'The Little Professor's Mythology: A Piagetian Explanation'. Transactional Analysis Journal, 7 (3), pp. 209–216.

Herman, J.B., Dunham, R.B., and Hulin, C.L. (1975). 'Organizational structure, demographic characteristics, and employee responses'. Organizational Behavior and Human Performance, 13 (2), pp. 206–232.

Hine, J. (2005). 'Brain Structures and Ego States'. Transactional Analysis Journal, 35 (1), pp. 40–51.

Hinton, P.R., Brownlow, C., McMurray, I., and Cozens, B. (2004). SPSS Explained. East Sussex: Routledge.

Hiriyapp, B. (2009). Organizational Behavior. New Delhi: New Age International.

Ho, R. (2006). Handbook of Univariate and Multivariate Data Analysis and Interpretation with SPSS. Boca Raton: CRC Press.

Jacobs, A. (2000). 'Psychic Organs, Ego States, and Visual Metaphors:

Speculation on Berne's Integration of Ego States'. Transactional Analysis Journal, 30 (1), pp. 10–22.
Jensen, A.R. (2006). Clocking the Mind: Mental Chronometry and Individual Differences. Amsterdam: Elsevier.
Jones, J. (1980). 'A Review on John G. Geier's: Personal Profile System'. Group & Organization Studies, 5 (4), pp. 507–509.
Josien, M., Vagiatis, G., and Giannouleas, M. (1995). Communication in the Work Environment. (3rd ed.). Athens: Ellinika Grammata Publications.
Kaushik, A., Pennathur, A., and Barnhart, S.W. (2010). 'Market Timing and the Determinants of Performance of Sector Funds over the Business Cycle'. Managerial Finance, 36 (7), pp. 583–602.
Kusluvan, S. (2003). Managing Employee Attitudes and Behaviors in the Tourism and Hospitality Industry. New York: Nova Science Publishers.
Landheer, P. (1981). 'A Development Script Questionnaire'. Transactional Analysis Journal, 11 (1), pp. 77–80.
Loffredo, D.A., Harrington, R., and Okech, A.P. (2002). 'Factor Analysis of the Ego State Questionnaire'. Transactional Analysis Journal, 32 (1), pp. 25–27.
Maditinos, D.I., Šević, Ž., and Theriou, N.G. (2007). 'Investors' behaviour in the Athens Stock Exchange (ASE)'. Studies in Economics and Finance, 24 (1), pp. 32–50.
Marston, W.W. (1928). Emotions of normal people. New York: Harcourt, Brace Co.
McKay, M., Davis, M., and Fanning, P. (2009). Messages: The Communication Skills Book. (3rd ed.). Oakland: New Harbinger Publications.
McKenna, M., Shelton, C., and Darling, J. (2002). 'The Impact of Behavioral Style Assessment on Organizational Effectiveness: A Call for Action'. Leadership and Organizational Development Journal, 23 (6), pp. 314–322.
McLain, J., and Kruse, T. (1980). 'Transactions in Advertisements'. Transactional Analysis Journal, 10 (1), pp. 17–20.
Melamed, T., and Jackson, D. (1995). 'Psychometric instruments: potential benefits and practical use'. Industrial and Commercial Training, 27 (4), pp. 11–16.
Mellor, J., Hyer, K., and Howe, J. (2002). 'The Geriatric Interdisciplinary Team App. oach: Challenges and Opp. rtunities in Educating Trainees Together from a Variety of Disciplines'. Educational Gerontology, 28, pp. 867–880.
Michlitsch, J. (2000). 'High-Performing, Loyal Employees: The Real Way to Implement Strategy'. Strategy and Leadership, 28 (6), pp. 28–33.
Munro, B.H. (2005). Statistical Methods for Health Care Research. Philadelphia: Lipp. ncott Williams & Wilkins.

Pace, W.R. (2002). Organizational dynamism: unleashing power in the workforce. Westport: Greenwood Publishing.

Pallant, J. (2007). SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS. (3rd ed.). Crows Nest: Allen & Unwin.

Pointdexter, W.R. (1972). 'The Excluded Parent and Child in Game Theory'. Transactional Analysis Journal, 2 (3), pp. 28–31.

Reid, P., and Reid, T. (2003). 'Personal Styles and Behaviours'. Industrial and Commercial Training, 35 (3), pp. 94–98.

Reynierse, J., Ackerman, D., Fink, A., and Harker, J. (2000). 'The Effects of Personality and Management Role on Perceived Values in Business Settings'. International Journal of Value-Based Management, 13, pp. 1–13.

Rosopa, P., Schroeder, A., and Hulett, A., (2013), 'Helping yourself by helping others: examining personality perceptions'. Journal of Managerial Psychology, 28 (2), pp. 147–163.

Rousseau, D.M. (1978). 'Characteristics of Departments, Positions, and Individuals: Contexts for Attitudes and Behavior', Administrative Science Quarterly, 23 (4), pp. 521–540.

Schaeffer, B. (2009). Is It Love Or Is It Addiction?. (3rd ed.). Center City: Hazelden Publishing.

Schmid, B. (2008). 'The Role Concept of Transactional Analysis and Other App. oaches to Personality, Encounter, and Cocreativity for all Professional Fields'. Transactional Analysis Journal, 38 (1), pp. 17–30.

Sims, R.R. (2002). Managing organizational behaviour. Westport: Greenwood Publishing Group.

Slowikowski, M. (2005). 'Using the DISC Behavioral Instrument to Guide Leadership and Communication'. AORN , 82 (5), pp. 835–843.

Steere, D. (1981). 'Body Movements in Ego States'. Transactional Analysis Journal, 11(4), pp. 335–345.

Steiner, C. (1990). Scripts People Live: Transactional Analysis of Life. New York: Grove Press.

Stevens, J. (2002). App. ied Multivariate Statistics for the Social Sciences. (4th ed.). Mahwah: Lawrence Erlbaum Associates.

Stewart, I., and Joines, V. (1987). TA Today: A New Introduction to Transactional Analysis. Nottingham: Lifespace Publishing.

Stewart, W. (2005). An A-Z of Counselling Theory and Practice. (4th ed.). Cheltenham: Nelson Thornes.

Struwig, F.W., and Stead, G.B. (2001). Planning, Reporting & Designing Research. Cape Town: Pearson.

Su-Fen, C., and Hsiao-Lan, C. (2005). 'Relationship between Job Characteristics

and Organizational Citizenship Behavior: The Mediational Role of Job Satisfaction'. Social Behavior and Personality: An International Journal, 33 (6), pp. 523–540.

Sulea, C., Virga, D., Maricutoiu, L.P., Schaufeli, W., Zaborila Dumitru, C., and Sava F.A. (2012) 'Work engagement as mediator between job characteristics and positive and negative extra-role behaviors'. Career Development International, 17 (3), pp. 188–207.

Switzer, L.N., and Huang, Y. (2007). 'How Does Human Capital Affect the Performance of Small and Mid-Cap Mutual Funds?'. Journal of Intellectual Capital, 8 (4), pp. 666–681.

Teale, M., Currie, D., Dispenza, V., and Flynn, J. (2003). Management Decision Making: Towards an Integrated. Harlow: Pearson Education.

Tett, R., Jackson, D., and Rothstein, M. (1991). 'Personality measures as predictors of job performance: a meta-analytic review'. Personnel Psychology, 44 (4), pp. 703–42.

Thomas, M. (1990). 'What is a human resources strategy'. Employee Relations, 12 (3), pp. 12–16.

Thomspon, H. (1976). 'An Example of Ego States'. Transactional Analysis Journal, 6 (2), pp. 131–132.

Tosi, H., and Mero, N. (2003). The fundamentals of organizational behavior: What managers need to know. Oxford: Blackwell Publishing.

Tosi, H., Mero, N., and Rizzo, J. (2000). Managing Organizational Behavior. (4th ed.). Massachusetts: Blackwell Publishers.

Wilson, M.G., Dejoy, D.M., Vandenberg, R.J., Richardson, H.A., and Mcgrath, A.L. (2004). 'Work characteristics and employee health and well-being: Test of a model of healthy work organization'. Journal of Occupational and Organizational Psychology, 77 (4), pp. 565–588.

Woodside, A.G. (1996). Measuring the effectiveness of image and linkage advertising: the nitty-gritty of maxi-marketing. Westport: Greenwood Publishing Group.

AIMS AND SCOPE

With our semi-annual edition we aim to present the exploratory work of experienced economists as well as economists of the younger generation who take an active interest in economic life and economic thought as well as their development.

Above all the *Archives of Economic History* will endeavor to shed some light on the course of economic policy and economic thought based on historical material.

In order to render its mission more complete, the *Archives of Economic History* will include the publication of selected double blind peer reviewed papers of general scientific interest cited in the Journal of Economic Literature (JEL) classification system.

The *Archives of Economic History* is indexed and abstracted in the electronic bibliographies of the American Economic Association since 1995

AUTHORS GUIDELINES

The submitted papers must be original work without prior publication or currently being considered for publication, and will be approved by two specialists. The following conditions and procedures for the articles submission should be taken into consideration:

1. **Articles must be written in English and submitted in MS-Word (doc or docx).**

Their length should not exceed a maximum of 30 pages. A complete article should contain two files: the abstract file (maximum length: 120 words) and a main body text file.

2. **On the first page of the abstract file** the following information should be printed:

a. Title of the article
b. Author's/Authors' name and surname (in capital letters)
c. Name of Institution and Department where the author is employed
d. Author's contact details: mailing address, telephone number and e-mail address.The code of classification of the submitted article should appear after the abstract according to the JEL classification system, and should be no more than 6 keywords.

3. **Only the title of the article** should appear at the top of the first page of the main body text file. All papers should be submitted to: akiohos@otenet.gr
4. **Acknowledgements of references** of the original source of the articles should appear after the endnotes and before the bibliographical references.
5. **Tables or Graphs** should be written clearly and their size should not exceed a regular A4 page. They should also be entitled and numbered accordingly (e.g. "Table 1:", "Graph 1:" etc.)
6. **Paragraphs** must be numbered in Arabic numbers, starting from introduction (e.g. 1, 1.1, 1.2,2, 2.1, 2.2 etc.).
7. **The article** should be accompanied by the bibliography directly relevant to its subject. Footnotes should be consecutively numbered and appear at the end of the article, before the bibliographical references.
8. **The formulae** should follow a consecutive numbering on the right hand side of the page.
9. **Quotations cited in the main text or in the footnotes** include the surname of the author, the year of publication and specific page numbers, for example: (Elton, 1967) or (Montesano and Brown, 2008) citing both names of two, or (Viaggi et al., 1991), when there are three or more authors.

Bibliographical references on the last page of the article should be written in alphabetical order, as follows:

i) For books: e.g. Strunk, W., and White, E. B. (1979). The elements of style. (3rd ed.). New York: Macmillan.
ii) For articles: e.g. Van der Geer, J., Hanraads, J. A., and Lupton, R. A. (2000). 'The art of writing a scientific article'. Journal of Scientific Communications, 163 (1), pp. 51–59.

10. **Among the articles submitted**, those that fulfill the above criteria are forwarded to referees for assessment.
11. **Failure to apply the above terms** will result in the rejection of the article or its return to the author for review and editing.
12. **The author is informed** whether or not the article submitted has been accepted or will be accepted upon improvements made based on the comments of the referee or the editorial board. When the author has completed the proofs reading of the articles no further additions or changes to the text are allowed.
13. **Failure to a timely submission** of the proofread article directly means that the article will not be included in the current issue.
14. **Articles under review** should be submitted to the following address: Professor Petros A. Kiochos, Editor in Chief of the Archives of Economic History, 84 Galatsiou avenue, Athens 111 46, Greece, **Tel. No.** (+30) 210-2910866 or, (+30) 693-7244739. Alternatively papers may be submitted to: akiohos@otenet.gr