

Vogiatzis, Ioannis; Siriopoulos, Costas; Frangos, Nikolaos

Article

Effects of the Public Sector downsizing on Social Security and public finance

SPOUDAI - Journal of Economics and Business

Provided in Cooperation with:

University of Piraeus

Suggested Citation: Vogiatzis, Ioannis; Siriopoulos, Costas; Frangos, Nikolaos (2014) : Effects of the Public Sector downsizing on Social Security and public finance, SPOUDAI - Journal of Economics and Business, ISSN 2241-424X, University of Piraeus, Piraeus, Vol. 64, Iss. 1, pp. 53-62

This Version is available at:

<https://hdl.handle.net/10419/169148>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



Effects of the Public Sector Downsizing on Social Security and Public Finance

Ioannis Vogiatzis^a, Costas Siriopoulos^b, Nikolaos Frangos^c

^a*University of Patras, Department of Business Administration, University Campus, Rion 26500 Patras, Greece, email: ioanniseb@yahoo.gr*

^b*University of Patras, Department of Business Administration, University Campus, Rion 26500 Patras, Greece, email: siriopoulos@upatras.gr*

^c*Athens University of Economics, Department of Statistics, Patission 76, 10434 Athens, Greece, email: nef@aueb.gr*

Abstract

This paper presents the results of the actuarial valuation method Projected Unit Credit (“benefits/years of service”) in order to assess the effects of the public sector downsizing on real economy and social security in Greece, using a prototype data set. We found a social security loss of about 1.3 bn.€, and the effect on the GDP is estimated -13.6 bn.€ (or -7%). We also report a decrease in the direct income by 6.1 bn.€.

JEL classification: C58; H55.

Keywords: Projected Unit Credit Method, Public Sector Downsizing, Pensions, Social Security

1. Introduction

The measure of downsizing of the public sector that is being attempted lately is also presented as a financial necessity that is supposed, on the one hand, to offer the appropriate resource saving to the public expenditure, necessary for the “reorganisation and survival” of the Greek State, and, on the other hand, to allow the optimal operation of the administration with fewer personnel.

For the aforementioned goals to be achieved and after the measure of “compulsory labour reserve” of the Greek Law 4024/11¹ (Greek Government Gazette 2010), the measure of “compulsory mobility” of Civil Servants has been selected for study. This measure combines normal withdrawals (retirements), recruitment of new civil servants at a ratio of one recruitment every five withdrawals (1:5) and compulsory dismissals

¹ Greek Government Gazette 226/ Issue A’/27.10.2011. Greek Law 4024, on pension provisions, unified wage – rank grid, labour reserve and other provisions on the application of the medium-term fiscal strategy framework 2012-2015.

by 2016, according to the provisions of the Greek Laws 4046/12² and 4093/12³ (Greek Government Gazette 2010), which provide the reduction of the General Government positions by at least 150,000.

According to the official data on the Greek Civil Servants in receipt of a salary (Greek Ministry of Finance), on November 2, 2012, by the Greek Ministry of Administrative Reform and e-Governance, the total number of civil servants to whom the measure of “compulsory mobility” refers was 623,536, with a ratio of 53.3% men and 46.7% women. From those, 68.87% are holders of a university degree, 12.37% of whom have a master’s degree or a doctorate. The civil servants up to 50 years old are 454,114 (72.82%), while those over 50 years old are 169,422 (27.18%). According to the above, the percentage of the level of education and the age distribution of the civil servants are satisfactory. The Greek percentage of civil servants on the total employment is 16.9%, which is lower than the average of the developed countries of Europe, the USA and Canada, which is deemed satisfactory.

These civil servants are required to engage in a particularly difficult economic environment, where, the GDP growth is negative (-6.7% in 2011), the unemployment rate is increasing (26% in 2012) and the public debt is also increasing.

According to the Greek Minister of Administrative Reform and e-Governance (Le Monde, February 20, 2013), “...*The performance of the reforms that have been undertaken in the central administration will result in an average reduction of the administrative structures by 38%, a fiscal benefit of 12% on average, while the adoption of the new organisation charts will allow the optimal operation of the administration with fewer personnel...*” The goal of reducing the number of civil servants is the result of a macro-economic calculation of the financing needs of the Greek State. From an operational aspect, it is very ambitious (approximately -21% in 5 years) and its achievement presupposes the organisation of an unprecedented transfer of personnel between the various administrative units, as well as a plan of re-evaluation of bodies, so that the new structures will have the appropriate responsibilities and abilities’.

However, is this measure the appropriate one? What effect will it have on the property of the civil servants pension body and the GDP in the mid-term? This paper will try for the first time to offer answers to the above questions. However, it is very important to provide measurable implications of a downsizing of the public sector, for different reasons.

First, the insurance contributions of 2012 were 12,654 m. €, decreased by -4,834 m. € or -27.64% in comparison to the respective ones of 2011, and constitute 32.47% of the Social Security Organizations income. A further decrease - due to the effect of the measure - of the insurance funds income from insurance contributions by -1,285.3 m. € or 10.15% will constitute a particularly strong blow to their already bad finance and will endanger their sustainability. The income has already dropped by -15.1% in the first semester of 2013.

Secondly, the decrease of the General Government position by 120,000 will disrupt the relation between insured persons and pensioners and, as a result, the contributions system of the Civil Servants Fund will be significantly disrupted, as the 120,000 civil

² Greek Government Gazette 28/ Issue A’/14.2.2012. Greek Law 4046, on the approval of the draft Financial Facility Agreement between the European Financial Stability Facility (EFSF), the Hellenic Republic and the Bank of Greece, and other urgent provisions on the decrease of the public debt and the rescue of the national economy.

³ Greek Government Gazette 222/ Issue A’/12.11.2012, Greek Law 4093, on the approval of the medium-term fiscal strategy framework 2013-2016. – Urgent measures of application of the Greek Law 4046/2012 and the medium-term fiscal strategy framework 2013-2016.

servants constitute 19.25% of all Civil Servants, according to the census by the Ministry of Finance on 2.11.2012. Consequently, the future problem of the civil servants fund will be a property problem, and it will not be able to cover its future pensioners, as the future contributions will be less than the benefits. Its income will come from a smaller number of civil servants with lower contributions, at the same time, due to salaries and experience. Also, the Fund will not have created a reserve with which it would be able to cover the benefits it has already undertaken. As a result, the value of the future contributions will be lower than that of the benefits that will gradually accumulate in the future.

Following the above, the pensions will necessarily decrease or/and there will be a disproportionate increase in contributions in comparison to the pension paid. Consequently, a social problem will be created, the jobs will decrease, as the pensioners will not be able to consume, the standard of living will drop, the quality of life will decline etc.

Finally, the social cost of unemployment / dismissal is uncountable (mental disorder symptoms, health problems, alcoholism, suicides etc.). The unemployment / dismissal in the public sector, directly or through labour reserve, suspension or mobility, are not only a deeply antisocial measure, but also a financially ineffective one. It will have negative multiplicative effects not only directly, on public finance, but also indirectly, as consumption will drastically decrease in the private sector (and, therefore, the collection of contributions and taxes). In addition, the last three years, Greece has had a loss of 65 billion, approximately half of which concern retail trade. As a result, more small and medium-sized enterprises will close and more jobs will be lost, beyond the 850,000 jobs that have already been lost in the last four years. The volume of retail sales has already decreased by -15.6% in the first two months of 2013, while, at the same time, the income from indirect taxes has dropped significantly. The funds that the Greek Public Sector loses due to unemployment could possibly be invested in the market, so that economy and growth can progress.

The paper is organized as follows. Section 2 presents our data set. Section 3 discusses the assumptions and restrictions of our study. In Section 4 we present and discuss the results of the actuarial method followed. Section 5 gives the effects on real economy and social security, and finally, section 6 concludes the paper along with a discussion of the main results.

2. The Data base

This study aims to check the measure of downsizing of the public sector by at least 150,000 positions in the period 2012 – 2016, as the Greek Government and Parliament have undertaken, passing the Greek Laws 4046/12 & 4093/12. The study was carried out based on the provisions of the Greek Laws 3863/2010⁴, 3865/2010⁵, 4024/2011, and the data on Public Servants on receipt of a salary, on 2.11.2012, by the Ministry of Finance. We also consider the Government announcements in combination with the specifications for carrying out actuarial studies according to the Greek Ministerial Decision No. 21533/293/12.9.2006 (Greek Government Gazette 1432/Issue B²/28.9.2006), which relies on two main factors: a) the demographic and b) the economic factor.

⁴ Greek Government Gazette 115/ Issue A²/15.7.2010. Greek Law 3863, on the new insurance system and relevant provisions, provisions on employment relationships.

⁵ Greek Government Gazette 120/Issue A²/21.7.2010. Greek Law 3865, on the reform of the Public Sector pension system and relevant provisions.

Beyond the aforementioned laws, our study has taken account of the data on the Greek Civil Servants in receipt of a salary, on November 2, 2012, by the Greek Ministry of Administrative Reform and e-Governance, as well as the new charter of Pensions of the Public Sector / Wider Public Sector, with establishment of pension rights/recognition of notional times etc. It is a combination of voluntary normal withdrawals – retirements (in combination of the provisions on civil servants with the registry of the Civil Servants on receipt of a salary), recruitments of new civil servants at a ratio, based on the law, of one recruitment every at least five withdrawals (1:5), at the age of 32 for men, 30 for women, and with 50% allocation of men – women, which is approximately the percentage of the census, as well as compulsory dismissals.

In order to carry out the actuarial study, we processed two civil servants data archives, with different analytical data per person. Combining archives 1 and 2, only the common entries were selected, while the “problematic” ones were exempted. In this way, the quality of the data per person is considered satisfactory, focusing on the necessary data for the calculation of the Current Values. The data archive that we finally processed includes approximately 120,000 Civil Servants.

For the purpose of our study, we accept that for the years 2013, 2014, and 2015 we will have retirements (R), compulsory dismissals (CD) and new recruits (NR) as presented in Table 1.

Table 1. Retirements, Dismissals, and New Recruits: 2013-2015

Year	R	CD	NR = 1/5 * (R + CD)
2013	35,000	29,000	12,800
2014	28,000	30,000	11,600
2015	28,000	-	5,600
Total	91,000	59,000	30,000

With a fixed ratio of one recruitment every five withdrawals (1:5), the achievement of the goal of employment reduction in the general government by at least 150,000 positions imposes the withdrawal of 187,500 civil servants with the concurrent recruitment of 37,500 new civil servants. However, as the ratio of 1:5 can be converted to 1:10 or other ratios, it was deemed advisable to study a fixed and specific case, as described above. The study calculates the result per person and, therefore, it can be easily adjusted to any other final number of withdrawals.

In case of suspension, which is provided by the aforementioned laws, the public sector pays 75% of the Main Salary (M.S.) for one year, without anything being returned to it in the form of work. At the same time, the remaining 25% of the M.S., which is not carried to the market through the payroll, contributes to the percentage reduction of the public deficit (as dismissals do), but it negatively affects the GDP multiplicatively through the fiscal multiplier.

A public servant can remain at a state of suspension for one year the most and, if he/she has not been absorbed in another position by then, he/she is dismissed. But already with the Greek Law 4024/11, the vacant established positions have been revoked and, therefore, the absorption is difficult.

3. Projected Unit Credit: Assumptions and Restrictions

The date of calculation of the study data is 12/2012. The EVK 2000 actuarial tables were used, with 3.8% technical interest rate for the period 2012 – 2016, based on the

expected returns of the reserves (investments) in Greece. For the technical interest rate to be calculated, the Bank of Greece was taken into account, which defines the average annual interest rate at 4.7 % and the average interest rate of all deposits at 2.85% for 12/2012. IMF and European Commission were also taken into account, which forecast that Greece will recover from recession in the first semester of 2014, with a growth rate of 0.6%.

The Projected Unit Credit Method (PUC) was selected and used (Bone and Kabel 1986). This is an actuarial valuation method in which each period of service is giving rise to an additional unit of benefit entitlement and measures each unit separately to build up the final obligation (known also as “benefits/years of service” method). There has been a trend in many countries towards Projected Unit Credit (the UK, Canada, for example). PUC is justified by its transparency and understandability. It is the method selected by the major accounting bodies for the pension expensing requirements that are being imposed on plan sponsors (Pugh 2006). For a discussion of actuarial methods see I.Papakonstantinou (1994) and C.Artikis (2012).

Under PUC the current salary of the insured person is projected on his/her retirement date using an assumption for his/her pay scale, which is provided in our case by the Greek Law 4024. Due to this reason, the assumption for the increase in salaries is as close as possible to the one that will be granted in practice in the following years, so that the calculation will not include a big actuarial error.

The most typical feature of the selected populations is the age, because the calculations were carried out according to the civil servant's age and years of service (≥ 28). The civil servants to retire must have at least obtained a retirement right by 31.12.2010, with 25 years of service, according to the Greek Laws 3863/2010 and 3865/2010, namely ≥ 28 years of experience, ≥ 58 years old. The normal retirement age is ≥ 65 years old for men and ≥ 63 years old for women.

The average gross salary is 1,700 € due to age and years of experience, and the average gross pension is 1,190 € due to age and years of work, with a 50% men – women ratio, which is approximately the amount of the census. The tax on civil servants on active service is 25%, the tax on pensioners is 20%, the tax on new recruits is 15%, the amount to be withheld for pension is 6.67%, the number of the salaries, contributions and pensions paid are 12 per year. The life expectancy is 78.3 for men and 83.1 for women, according to research by the Hellenic Statistical Authority for 2010. The contributions for the lump sum retirement benefit are returned with 3.8% interest rate (once) in case of dismissal, with 20% interest tax.

The study was based on the process of the data per person, assuming that the assumptions concerning the calculation will remain unchanged. In this study, the work experience cannot be calculated and cost accounted, which results in the disruption of the State mechanism. The health and unemployment are also not cost accounted.

4. Results of the actuarial study

With the use of the Swiss EVK 2000 tables and based on the above, the actuarial study was carried out and gave the following results per person. Table 2 presents the current value of salaries, contributions and pensions of a man and a woman 58 years old, with a salary of 1,700 €. Table 3 calculates the case the insured person directly retires, at the age of 58.

Table 2: For a civil servant that will have a “normal” withdrawal / retirement

Age	58	58
Sex	Man	Woman
Salary	1,700	1,700
Retirement age	65	63
Number of contributions paid	12	12
Number of pensions paid	12	12
Current value of salaries ^{F1}	126,839	94,796
Current value of contributions ^{F2}	8,460	6,323
Current value of pensions ^{F3}	110,438	148,780
Current value of tax on salaries ^{F4}	31,710	23,699
Current value of tax on pensions ^{F5}	22,088	29,756

where: F1: current value of the employee’s salaries, from the calculation age to the retirement age,
 F2: current value of the contributions on the employee’s salary, from the calculation age to the retirement age,
 F3: current value of the employee’s pensions, from his/her retirement age to the life expectancy age/gender,
 F4: current value of the tax only on the employee’s salaries, from the calculation age to the retirement age (no child),
 F5: current value of the tax on the employee’s pensions (sole income), from his/her retirement age to the life expectancy age/gender (no child).

Table 3. For a civil servant that will have an “early” withdrawal / retirement

Age	58	58
Sex	Man	Woman
Salary	1,700	1,700
Retirement age	58	58
Number of contributions paid	12	12
Number of pensions paid	12	12
Current value of salaries	-	-
Current value of contributions	-	-
Current value of pensions ^{F6}	181,468	201,866
Current value of tax on salaries	-	-
Current value of tax on pensions ^{F7}	36,294	40,373

where: F6: current value of the pensions, from the retirement age to the life expectancy age/gender (no child),
 F7: current value of the tax on the employee’s pensions (sole income), from his/her retirement age to the life expectancy age/gender (no child).

Table 4 gives the results for the current value of salaries and contributions of new recruits, for a man 32 years old & a woman 30 years old, with a salary of 988 € for 5 years.

Table 4. For a new recruit

Age	32	30
Sex	Man	Woman
Salary	988	988
Years of calculation	5	5
Number of contributions paid	12	12
Current value of salaries ^{F8}	55,676	55,708
Current value of contributions ^{F9}	3,714	3,716
Current value of tax on salaries ^{F10}	8,351	8,356

where: F8: current value of the salaries of a newly-employed person, for a 5-year period,
 F9: current value of the contributions on a newly-employed person's salary, for a 5-year period,
 F10: current value of the tax only on the newly-employed person's salaries (sole income), for a 5-year period (no child).

From the above, the expenses of the Public Sector are the following: for a 58-year-old man (woman) that will remain in the service until the age of 65 (63), 175,019 € (183,798 €), for a 58-year-old man (woman) that will retire immediately, 145,174 € (161,493 €), for a 32-year-old newly-employed man (woman), for a 5-year period, 43,611 € (48,650 €).

4.1 Retirements & new recruits

Based on the above, the following actuarial balance (Table 5) of comparison of normal with direct retirements and new recruits for 2012 – 2016 was formed, with the aim of finding the result for the Public Sector without their effect on the GDP.

In this study, the particularity of the Public Sector is that it is the employer that pays and, at the same time, the receiver of the insurance contributions and tax income.

Table 5. Actuarial Balance of comparison of 91,000 retirements and 30,000 new recruits (Amounts in €)

Current value of inflows		Current value of outflows	
(56,000 Normal retirements)		(56,000 Normal retirements)	
Contributions	429,951,500	Salaries	6,446,102,500
Salary tax	1,879,751,611	Pensions	6,970,539,000
Pension tax	1,394,122,000		
Total	3,703,825,111	Total	13,416,641,500
Financial result (1)	9,712,816,389		
(35,000 Direct retirements)		(35,000 Direct retirements)	
Pension tax	1,372,265,000	Pensions	6,861,330,000
(30,000 New recruits)		(30,000 New recruits)	
Contributions	111,450,000	Salaries	1,670,760,000
Salary tax	250,605,000		
Total	1,734,320,000	Total	8,532,090,000
Financial result (2)	6,797,770,000		

As a result the Profit of the Public Sector is equal to 2,915,046,389 € without calculating its effect on the GDP.

4.2 Dismissals

Total dismissals are 55,000 (= 59,000 – 4,000 offenders etc.) The 4,000 offenders etc. are not counted in the cost of the case of “compulsory mobility of Civil Servants” under examination, because their dismissal is not caused by the measure, but it is provided by the law.

Table 6. Public Sector’s Profit from the 55,000 dismissals

Profit of Public Sector by lack of payroll:	6,094,962,500 €
Loss of Insurance Organization income:	406,532,500 €
Loss of tax income of the Public Sector:	1,523,747,500 €
Interest-bearing return of lump sum retirement benefit contributions:	742,101,748 €

In conclusion, the Profit for the Public Sector is 3,422,580,752 € without calculating the effect on the GDP

5. Effect on Social Security and real economy

The effect of the aforementioned results on the civil servants pension body is that the Loss of the Social Security system will be quite large as of -1,285,374,394€. The following Table presents the analytical calculations.

Table 7. Loss for the Social Security System

35,000 Directly retired	-242,675,000€
55,000 Dismissals	-406,532,500€
Interest of the return of lump sum retirement benefit contributions of the civil servants under dismissal ⁶	-22,056,994€
Return of lump sum retirement benefit contributions of the civil servants under dismissal ²	-725,559,900€
30,000 New recruits	111,450,000€

As a result⁷ the loss for the Social Security is -1,285,374,394€ without calculating their effect on the GDP.

When the payroll of the civil servant and the pension of the pensioner are spent in real economy, they produce income for a series of individuals and do not constitute expenditures for the state, but investments that will return significant income through tax (direct or indirect). The state ceases to collect taxes only when the whole amount of the payroll or pension has returned to the state or has ended up at the banks, which can lend up to ten times more money than that it has in its funds and make profit, while the state collects its taxes upon the creation of each new value and in every repeated transaction.

⁶ The amount is calculated at 2008 rate, with average service o 18 years, with 39.98% reduction for contributions – benefits adjustment (C.S. 37.67% and public entities 42.29%) and with 1.9% interest / semester, according to the returns of the common capital of the Insurance Organizations at the Bank of Greece.

⁷ Return of lump sum retirement benefit contributions due to dismissals -725,559,900 €. It is possible that the welfare fund does not have reserves (as the Civil Servants sector of the Civil Servants Welfare Fund) to cover the expenditure and that this amount must be incurred by the State Budget.

The relationship of fiscal policy and growth is interactive. On the one hand, the fiscal multipliers work, namely the percentage effect on the GDP from the increase or decrease of the public deficit by one per cent. On the other hand, the effect of the increase or decrease of the GDP on the public deficit works (namely through the return of the tax rates and extraordinary expenditures).

If the multiplier is very high, in practice >1 , then the fiscal policy applied by the governments strongly affects the income and employment. The opposite happens when the rate of the multiplier is <1 .

In the current economic circumstances of deep recession in Greece, the multiplier of the public expenditures for salaries, pensions and benefits is assessed up to 2.35 (Monokroussos and Thomakos 2012). In addition, according to Christiano et al. (2009), when the monetary policy is inactive and the economy is in recession, as in Greece, the fiscal multiplier can be 2 - 3.

For our study, the 2.35 fiscal multiplier calculated by Monokroussos and Thomakos (2012) was selected.

Table 8. Effect on the GDP (amounts in €)

A. Results of 91,000 retirements and 30,000 recruitments		Loss	Profit
a) for the Public Sector			2,915,046,389
b) for the GDP (with 2.35 Fiscal Multiplier)		-5,576,138,750	
b.1) Direct pension (2013)	-2,011,776,250		
b.2) Normal pension	<u>-3,564,362,500</u>		
B. Results of Dismissals			
a) for the Public Sector			3,422,580,752
b) for the GDP (with 2.35 Fiscal Multiplier)		-8,043,064,767	
		-13,619,203,517	6,337,627,141

6. Discussion and Conclusions

In this paper we measure the effects of the Greek public sector downsizing on social security and public finance. The effects of the measure are mainly noticed in the GDP – public income, the unemployment – dismissals and the Social Security.

With regard to public income and the GDP, the measure will decrease public expenditures by 6,337.6 m. € or 5.95%, but, at the same time, it will burden the GDP with a decrease of approximately -13,619 m. € or -7.03%, and will give particularly negative dynamics to the already declining progress of the GDP, with unpredictable negative effects mainly on the public income, which is closely associated with the GDP.

This decrease of the GDP can be translated into a decrease in the *direct* income of the State by -6,087.8 m. €, if we agree with the opinions of the European Commission, which defines the income percentage of the general government as a percentage of the GDP for 2012 at 44.7% (European Commission ECFIN 2013) and, thus, an insubstantial profit of 249.8 m € appears in the public income.

This income cannot compensate the socio-economic cost of unemployment / dismissal in the recession and unemployment environment that we described. The unemployment rate of the third semester of 2012, the highest since 1998, was 24.8%, with 1,230,918 unemployed, increased by 1.2% since the previous semester. The 55,000 compulsory dismissals that we described above will increase the employment rate by 1.1%.

In conclusion, the application of this measure for the downsizing of the State and the relief of the public finance by 2016 is performed without the necessary planning for the expected result on the GDP, the public income, the unemployment through dismissals, the Social Security, and it will create significant administration gaps due to the lack of experienced public servants.

References

- Artikis, T.C., 2012. Formulating a stochastic discounting model with actuarial and risk management applications, Vol 62, Issues 3-4, pp. 7-15.
- Bone, S. M. and Kabel, A. J., 1986. The Projected Unit Credit Method of Funding of Superannuation Plans, Institute of Actuaries of Australia.
- Christiano, L., Eichenbaum, M., Rebelo, S., 2011. When is the Government Spending Multiplier Large? *Journal of Political Economy*, Vol. 119, Issue 1, pp.78-121.
- ECFIN Statistical Annex of European Economy, European Commission, Spring 2013.
- Monokroussos, P., Thomakos, D., 2012. Fiscal multipliers in deep economic recession and the case for a 2-year extension in Greece's austerity programme, *Economy & Markets*, vol.VII Issue 4, pp. 1-44.
- Papakonstantinou, I., 1994. An actuarial investigation into the mortality of impaired insured lives, *SPOUDAI*, Vol. 44, Issues 1-2, pp. 40-61.
- Pugh, C., 2006. Funding Rules and Actuarial Methods, *OECD Working Papers on Insurance and Private Pensions*, No. 1, OECD Publication.