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DETERMINANTS OF HEALTH CARE EXPENDITURE IN GREECE: CAN PRIMARY HEALTH CARE IMPACT ON THEIR EVOLUTION?

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ABSTRACT: This paper identifies and analyzes the determinants of public and private health care expenditure in Greece over the period 1970-2004 to assess its relationship with the lack of an integrated Primary Health Care System. The determinants assessed are those commonly stated in international literature as influencing health expenditure growth, i.e. per capita GDP-Gross Domestic Product- (income), demographic ageing and induced demand, expressed through the number of physicians. Several multiple linear regression models were developed and selected through stepwise entry and backward elimination. Dependent variables were per capita public and private health care expenditure. According to the results, the most important determinant, for both public and private health care expenditure, is population ageing. Per capita GDP is strongly and positively related to public health care expenditure, as well as to private health care expenditure, the latter, however, in a non-statistically significant form. The development of an Integrated Primary Health Care System in Greece has been constantly under discussion and review for the past two decades. Nonetheless, the lack of gatekeeping mechanisms as well as patient monitoring and general population prevention programmes have led to significant and consistent increases in both public and private expenditure.

INTRODUCTION: Over the last three decades, the issue of defining the determinants of healthcare spending, public or private has remained quite active across the literature.

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Through the years, several studies have indicated a statistically significant positive correlation between per capita health expenditure and per capita income; starting with the seminal 1997 paper by Newhouse [1] that indicated that 90 percent of the observed variation in the per capita health expenditure can be explained by the variation in Gross Domestic Product (GDP), a number of subsequent studies [2-7] adopted a demand function approach to estimate income elasticity through models, where real per capita health expenditure is

hypothesized to be a function of real per capita income, the number of physicians, medical technology, ageing (population >65) and/or public sector involvement in health expenditure increase (share of public expenditure to total health expenditure).

Income elasticity of overall healthcare spending is found to exceed unity indicating that health care is a luxury good [8], although newer evidence suggests that when differentiating between public and private expenditures, elasticity tends to be below and above one, respectively [9]. However, the examination of the influence of income, as well as other factors at the national level, yields different results, especially when diverse methods are used, most probably owing to differences in the organizational structure of health systems in the developed economies [10]. In addition, according to OECD studies, the differences in results concerning the influence of income on health spending may reflect differences attributed to the time periods they refer too [11].

In recent years, several factors have been tested as to their level of influence on overall health expenditure. Among these, institutional changes in the system [12], health care personnel wages [13], policy choices [14] and demographic changes were shown to have a statistically significant impact on aggregate spending. Especially with regards to demographic data, a vivid debate still exists as to whether age or life expectancy is a better predictor of expenditure, with no clear conclusion [15-17], up to date.

Over the last decades, a significant growth in health expenditure has been observed in most, if not all, industrialized nations. Greece may be a striking case; total health care spending in Greece over the past twenty years has consistently exceeded 10% of the country GDP, one of the highest amongst OECD countries [18].

Additionally, and although in most OECD counties with an established National Health Service, public health expenditure significantly exceeds private spending, in Greece private health expenditure accounts for approximately 48% of total health spending. This is mostly attributable to the particularly active private sector in a large spectrum of primary and hospital care services [19] combined with the lack of an integrated public primary care system that could both gate-keep and effectively manages demand [20]. Of this private spending, 95% is attributed to direct out-of-pocket payments [21-22] that further impact on household budgets.

In light of the above, this paper attempts to empirically investigate the upward drift of health spending in Greece over the period 1970-2004 and examine the determinants of public and private health expenditure separately. This period of time has been selected as a sufficient time frame that includes both the period prior to the establishment of the public NHS and all subsequent reforms in its structure, until 2004, when a Primary Care Law was passed [20]. Moreover, since 2005, the GDP of Greece has been extensively revised to include additional "activities" not previously included in its calculation.

MATERIALS AND METHODS: Data used in this study refer to the period 1970 - 2004. Data on health expenditure and per capita GDP come from OECD, calculated in constant Euros. Demographic data come from the Hellenic Statistical Authority (**Table 1**).

Response variables in the study are public and private health care expenditure, which are examined separately in relation to three independent variables: per capita GDP, number of physicians and population ageing. The multiple regression equation that is obtained from data for predicting the dependent variable from those three independent variables is:

$$\ln\hat{Y} = b_0 + b_1\ln X_1 + b_2\ln X_2 + b_3\ln X_3$$

Where, Y: per capita health care expenditure, public and private (PUPCHCE & PRPCHCE), X_1: per capita GDP (PCGDP), X_2: indicator of population ageing (AGED_100), X_3: number of physicians per 1000 population (PHYS_1000)

First, some descriptive statistics are produced for both variables (**Figures 1 and 2**) in order to check for outliers (as shown in Figure 1 there are two outliers in the case of Public HCE that should be excluded from the analysis).

TABLE 1: STATISTICAL DATA OF THE PERIOD 1970-2004

Year	Per capita GDP	Indicator of population ageing	Number of physicians per 1000 residents	Per capita Public HCE	Per capita Private HCE
1970	6528	10.84	1.59	164.94	222.34
1971	7067	11.42	1.69	201.60	191.70
1972	7676	11.40	1.73	257.63	237.37
1973	8266	11.69	1.90	311.91	281.62
1974	7718	11.99	2.00	261.49	240.52
1975	8115	12.23	2.04	298.02	270.30
1976	8572	12.44	2.11	340.06	304.57
1977	8695	12.60	2.20	351.38	313.80
1978	9190	12.78	2.26	396.92	350.92
1979	9378	13.04	2.34	414.21	365.02
1980	9354	13.14	2.43	342.75	273.79
1981	9118	13.20	2.54	390.29	345.52
1982	8961	13.25	2.65	375.85	333.75
1983	8814	13.27	2.80	362.33	322.72
1984	8946	13.30	2.85	374.47	332.62
1985	9137	13.34	2.93	392.04	346.95
1986	9157	13.47	3.06	393.88	348.45
1987	8935	13.54	3.33	395.67	264.38
1988	9298	13.65	3.20	333.17	282.85
1989	9620	13.81	3.29	390.70	308.64
1990	9569	14.03	3.38	377.54	325.57
1991	9706	13.82	3.65	376.93	328.37
1992	9667	14.11	3.75	418.91	348.07
1993	9425	14.42	3.85	455.76	380.32
1994	9534	14.70	3.85	464.18	460.76
1995	9659	14.98	3.87	485.60	447.47
1996	9818	15.26	3.89	499.83	448.08
1997	10112	15.55	4.00	506.39	451.95
1998	10395	15.86	4.14	508.31	468.06
1999	10704	16.16	4.25	552.69	481.98
2000	11147	16.47	4.33	582.64	525.51
2001	11627	16.80	4.39	673.03	540.11
2002	12032	17.20	4.59	672.37	570.08
2003	12545	17.52	4.75	704.32	609.10
2004	13085	17.85	4.89	692.71	620.34

Data source: OECD Health data 2009, National Statistical Service of Greece.

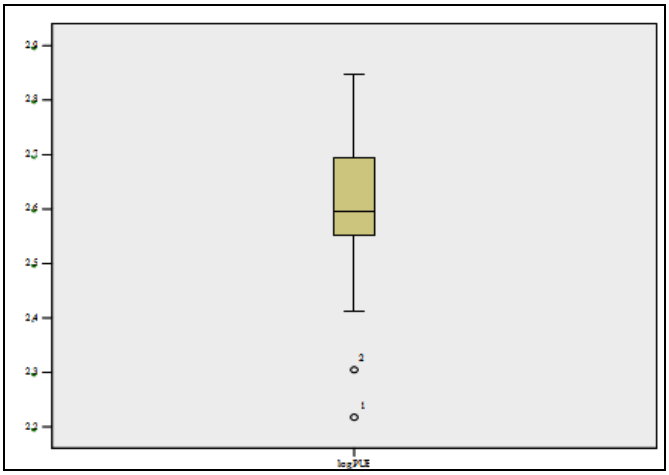

FIGURE 1: BOXPLOT FOR PUBLIC HCE

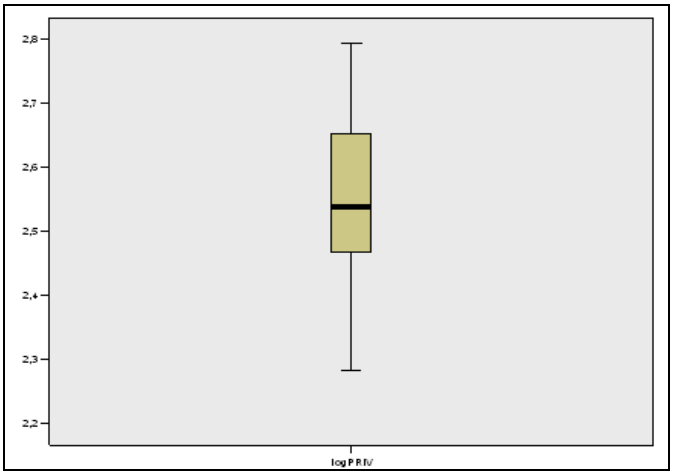

FIGURE 2: BOXPLOT FOR PRIVATE HCE

The normality assumption is examined for both dependent variables (Public and Private health care expenditure) by constructing the histograms and using the appropriate normality tests. Since the sample is small (N<40), the Kolmogorov-Smirnov and Shapiro-Wilk tests can be used to check for normality. The histograms and the normality tests indicate that the assumption of normality is violated, when the scalar form of the data is used.

The logarithmic form of data linearizes the regression coefficient of the underlying multiplicative regression equation. By transforming our data into the logarithmic form the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests are not statistically significant and as a result the normality assumption is no longer violated (**Tables 2 and 3**).

TABLE 2: NORMALITY TESTS FOR THE DEPENDENT VARIABLES - PUBLIC HCE
TESTS OF NORMALITY

	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	**Df**	**Sig.**	**Statistic**	**df**	**Sig.**
logPUB	.149	33*	.059	.954	33	.174

a Lilliefors Significance Correction. ∗ Outliers are excluded

TABLE 3: NORMALITY TESTS FOR THE DEPENDENT VARIABLES - PRIVATE HCE
TESTS OF NORMALITY

	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
logPRIV	.143	35	.068	.972	35	.513

a Lilliefors Significance Correction

The dependent variables used are the logarithm of the Per Capita Public Health Care Expenditure (logPUB) and the logarithm of the Per Capita Private Health Care Expenditure (logPRIV).

Moreover, the correlation coefficients are statistically significant and indicate a linear and strong positive relationship between the variables (**Tables 4 and 5**).

By using the multiple regression method the goal is to create a model that contains some of the independent variables that will best and most efficiently predict the dependent variable. Several techniques have been developed for deciding which of a group of candidate independent variables should be used in a final model. Each technique may produce different results. It is argued that using more than one technique is an appropriate method in order to evaluate the final model[23]. Using the '*stepwise* method' is more preferable for exploratory models, because the selection of the final variables entered into the model is based upon mathematical criteria.

In this study '*Enter' and 'Stepwise Entry'* are applied, and as it will be shown, both techniques produce similar results. The evaluation of the final models is based on the residual analysis/ diagnostics.

TABLE 4: BIVARIATE CORRELATION RESULTS - PEARSON'S COEFFICIENTS - PUBLIC HCE
CORRELATIONS

		logPUB	PCGDP	AGED_100	PHYS_1000
logPUB	Pearson Correlation	1	.949(**)	.961(**)	.899(**)
	Sig. (2-tailed)		.000	.000	.000
	N	33	33	33	33
PCGDP	Pearson Correlation	.949(**)	1	.959(**)	.887(**)
	Sig. (2-tailed)	.000		.000	.000
	N	33	33	33	33
AGED_100	Pearson Correlation	.961(**)	.959(**)	1	.960(**)
	Sig. (2-tailed)	.000	.000		.000
	N	33	33	33	33
PHYS_1000	Pearson Correlation	.899(**)	.887(**)	.960(**)	1
	Sig. (2-tailed)	.000	.000	.000	
	N	33	33	33	33

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

TABLE 5: BIVARIATE CORRELATION RESULTS - PEARSON'S COEFFICIENTS - PRIVATE HCE CORRELATIONS

		logPRIV	PCGDP	AGED_100	PHYS_1000
logPRIV	Pearson Correlation	1	.923(**)	.942(**)	.888(**)
	Sig. (2-tailed)		.000	.000	.000
	N	35	35	35	35
PCGDP	Pearson Correlation	.923(**)	1	.962(**)	.904(**)
	Sig. (2-tailed)	.000		.000	.000
	N	35	35	35	35
AGED_100	Pearson Correlation	.942(**)	.962(**)	1	.966(**)
	Sig. (2-tailed)	.000	.000		.000
	N	35	35	35	35
PHYS_1000	Pearson Correlation	.888(**)	.904(**)	.966(**)	1
	Sig. (2-tailed)	.000	.000	.000	
	N	35	35	35	35

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

RESULTS: We examined separately public and private health care expenditure in relation to per capita GDP, number of physicians and population ageing in an effort to assess which particular determinants influence public and which private health spending.

By using two different techniques we could evaluate better final models for each case (public and private). It is important to underline that the two different techniques gave similar results for each of the response variables.

Public health care expenditure: To select the independent variables that are statistically significant we used the '*enter'* method. Results are shown in **Tables 6 and 7**.

TABLE 6: OUTPUT FOR ENTER MODEL SELECTION

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.643	.105		15.633	.000		
	PCGDP	2.34E-005	.000	.261	1.420	.166	.066	15.236
	AGED_100	.059	.020	.895	2.937	.006	.024	41.753
	PHYS_1000	-.024	.023	-.192	-1.027	.313	.063	15.757

a Dependent Variable: logPUB

TABLE 7: OUTPUT FOR STEPWISE MODEL SELECTION

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.729	.047		37.118	.000		
	PCGDP	.063	.003	.961	19.381	.000	1.000	1.000
1	(Constant)	1.741	.045		38.954	.000		
	AGED_100	.042	.011	.633	3.801	.001	.080	12.449
	PCGDP	3.06E-005	.000	.342	2.055	.049	.080	12.449

Dependent Variable: logPUB

Only population ageing seems to constitute a predictor variable for public HCE. Population ageing is the only statistically significant variable (since p-value =.006<0.005) and it's positively related to public HCE.

The model is statistically significant, according to the ANOVA F-test, where p<0.0001. In addition, the adjusted R^2 statistic reports that 93.6% of the variability in the dependent variable is accounted for by the regression and verifies that there is a strong linear relationship between per capita public health expenditure and population ageing.

When the second model selection procedure, i.e. *stepwise*, is applied, two variables are entered in our final model; per capita GDP and population ageing.

The ANOVA F-test shows that the model is statistically significant and the adjusted R^2 statistic reports that 92.9% of the variability in the dependent variable is accounted for by the regression.

The regression equation for predicting public HCE is given by:

Predicted public HCE= 1.741 +0.42 population ageing + 0.00003 per capita GDP

The results indicate a positive relationship between population ageing as well as per capita GDP and the private health care expenditure.

However, the scatterplots (**Figure 3**) indicate that there is not a strong linear relationship between the above variables. Consequently, although statistically significant, these results offer us an exploratory model for the response variable but not a model that could adequately predict public HCE using population ageing and per capita GDP.

As shown in the residual plot in **Figure 4**, the points are spread randomly around zero line. The plot suggests that the underlying assumptions are met.

Private health care expenditure: According to the results of the *enter* method, population ageing seems to constitute a predictor variable for private HCE as well (as it is in the case of public HCE).

Table 8 indicates that p-value (=.001) is statistically significant (<0.005) for population ageing but not for the other two independent variables.

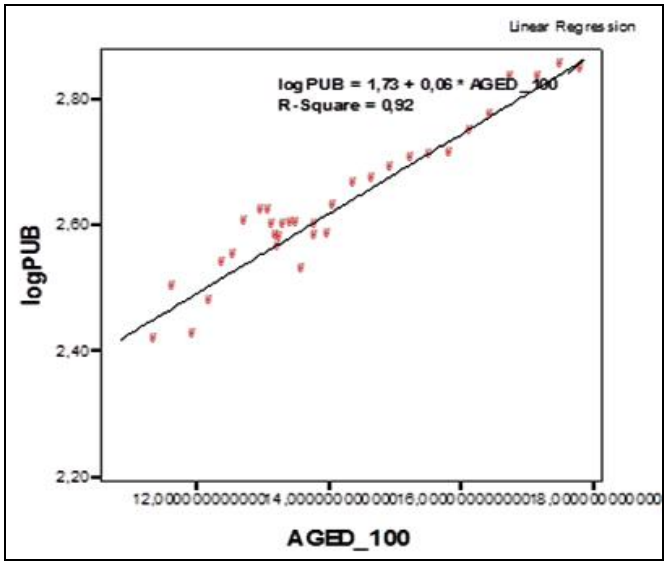

FIGURE 3: INTERACTIVE SCATTERPLOTS

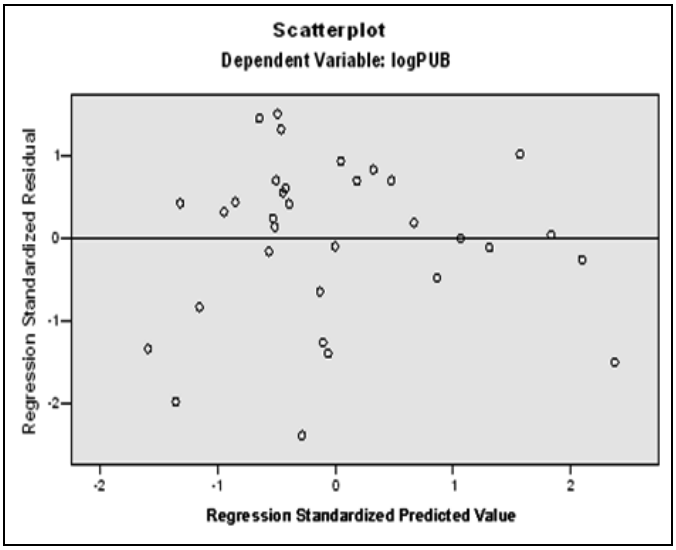

FIGURE 4: RESIDUAL PLOT FOR PUBLIC HCE DATA

TABLE 8: OUTPUT FOR ENTER MODEL SELECTION

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.435	.137		10.497	.000		
	PCGDP	-8.23E-006	.000	-.090	-.384	.704	.066	15.236
	AGED_100	.099	.026	1.466	3.775	.001	.024	41.753
	PHYS_1000	-.058	.030	-.459	-1.923	.064	.063	15.757

a Dependent Variable: logPRIV

The model is statistically significant since the p-value for the ANOVA F-test is <0.0001. The adjusted R^2 reports that 93.6% of the variability in the dependent variable is accounted for by the regression. Consequently, population ageing has a strong linear relationship with the per capita private HCE as well. The regression equation indicates that the relationship is positive.

The results of the multiple regression analysis using the stepwise method are presented in **Table 9**.

TABLE 9: OUTPUT FOR STEPWISE MODEL SELECTION

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.670	.059		28.108	.000		
	AGED_100	.063	.004	.939	15.157	.000	1.000	1.000

a Dependent Variable: logPRIV

The variable entered in the final model is population ageing (p-value<0.0001) as with the first method. There is a statistically significant relationship between the private HCE and population ageing (see Table 7). The adjusted R^2 reports that 87.7% of the variability in the dependent variable is accounted for by the regression.

The regression equation for predicting private HCE is given by:

Predicted private HCE= 1.67 +0.63 population ageing

The results indicate a positive relationship between population ageing and private health care expenditure.

Given that the scatterplot (**Figure 5**) does not indicate a strong linear relationship between the above variables, although statistically significant, these results may or may not lead us to conclude that private HCE results can be adequately predicted using population ageing.

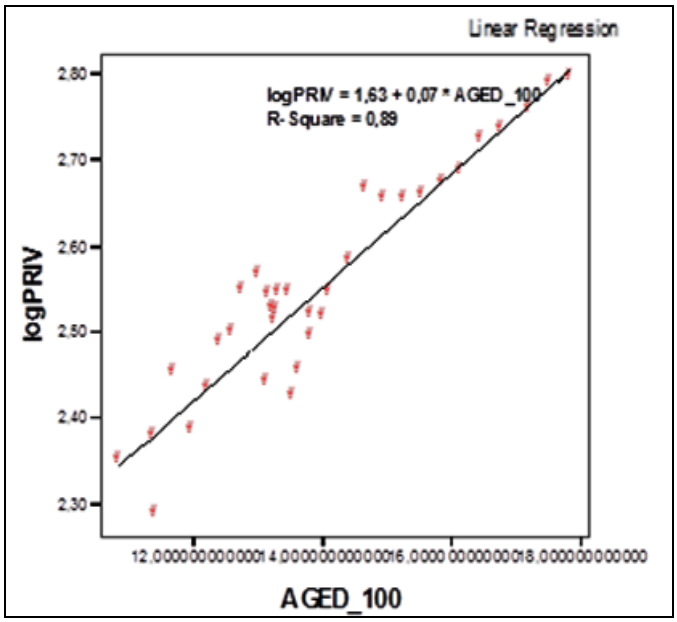

FIGURE 5: INTERACTIVE SCATTERPLOT - PRIVATE HCE VS POPULATION AGEING

However, the residual plot in **Figure 6** suggests that the underlying assumptions are met. The points are spread randomly around the zero line. There is, however, the appearance of a possible decrease in variability as the predicted public HCE increases.

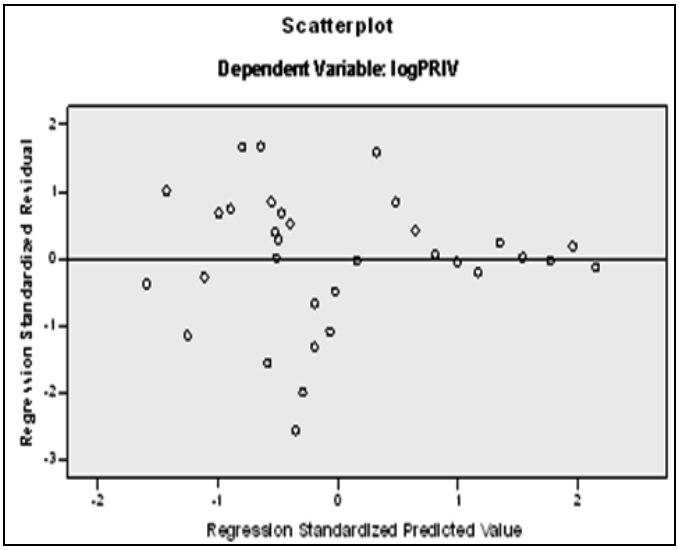

FIGURE 6: RESIDUAL PLOT FOR PRIVATE HCE DATA

DISCUSSION: Increases in health care spending, during the last decades, have been the subject of intense debate and research internationally. Following this trend, total healthcare spending in Greece continuously exceeds 10% of GDP, with no indications of reductions either in terms of absolute figures or of expenditure growth rates.

Taking the above into account, this paper attempted to assess the impact of the major determinants of health care spending, reported in the literature i.e. per capita GDP, number of physicians and population ageing, in the Greek healthcare context. The analysis followed a novel approach, examining the determinants of public and private health care expenditure separately, a practice rarely used in the literature up to date. In addition, two different regression techniques were used in order to better evaluate final models for each case (public and private) and to increase the robustness of outcomes.

It is important to underline that the two different techniques resulted to exactly the same findings for each case, creating the same regression equations and producing the same estimations for the coefficients of each independent variable entered in the final models. The results indicate that population ageing is the foremost important factor of health spending both in terms of public and of private expenditure. This is a well-established finding in the international literature whether ageing is proxied through age structure of the population [15] or through life expectancy [16].

The effects of ageing in the economics of the health care sector in Greece is a dimension that should be taken seriously into account by the system's stakeholders, given that the Greek population faces a severe demographic transition towards lower fertility rates and increased dependency percentages. Moreover, the analysis indicates a positive relationship with income, as expressed by per capita GDP and public health spending, whereas the same positive relationship with private spending appears to be statistically not significant.

The role of income in health spending has been repeatedly documented in the literature, corroborating the results of the present analysis. With regards to the weakening of the association between income and private spending, the reason should be sought to the extensive out-of-pocket payments, some of which are probably under-recorded and the documented phenomenon of informal ("hidden") payments to providers [21-22], the magnitude of which remains unknown.

Finally, the analysis did not show a correlation between the numbers of physicians with public health spending, whereas a marginally significant negative relationship with private expenditure emerged. Although this finding is partially contradicted by the literature, it is likely that it reflects the peculiarities of the Greek health care setting and, especially, the severe discrepancies in the distribution of physicians and health technology, as a whole, throughout the country [24]. Irrespective of which determinant affects the evolution of health care expenditure in Greece across these four decades, it is plain that the role of Primary Care in a health system with these characteristics is highly critical.

High private health expenditure in Greece is largely the outcome of the lack of an integrated primary health care system, which could monitor the type and quantity of demand for health services and plan for their provision in a managed manner. It should be noted that several primary care systems are in place and functional in the country but their integration is still pending. These systems operate in parallel and cover different populations (either by occupation or geographic region) with very different health needs. Such fragmentation does little to control the sources of expenditure.

Moreover, an issue of interest arises with regards to the contribution of private health expenditure when examining the data on spending of the disposable income of a household in Greece, depending on degree of urbanization (residents in urban, semi-urban or rural areas). According to data from the Hellenic Statistical Authority, based on the Household Budget Survey [25], households residing in rural areas spend 8.3% of their monthly disposable income to healthcare goods and services as opposed to 7% and 6.9% in semi-urban and urban households respectively. Given the increasing trends of age and morbidity in rural areas and taking into account that the disposable household income in those parts of the country is significantly lower than that of (semi) urban areas [32], an immediate call for action arises.

CONCLUSION: This research shows that the most important determinant for health care expenditure is population ageing. Additionally, increases in both public and private expenditure have been attributed to the lack of integration in primary health care. Even if the integration of primary health care does take some time to materialize, it is essential that specific steps are taken in the direction of addressing the impact of ageing on population morbidity through the introduction of disease management in chronic conditions in the primary care setting. The role of the GP in managing long-term diseases should be better defined and implemented. The development of GP networks, particularly in the rural areas of the country will aid timely support of a growing population of patients at a comparably low cost for the system, which is crucial in the current fiscal situation of the country.

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REFERENCES:

1. Newhouse JP: *Medical care expenditure: a cross-national survey*. Journal of Human Resources 1997; 12:115-125.
2. Barros PP: *The black box of health care expenditure growth determinants*. Health Economics 1988; 7:533-544.
3. Hansen P and King A: *The determinants of health care expenditure: a cointegration approach.* Journal of Health Economics 1996; 15:127-137.
4. Blomqvist AG and Carter RAL: *Is health care really a luxury?* J Health Econ 1997; 16:207–229.
5. Getzen TE: *Health care is an individual necessity and a national luxury: Applying multilevel decision models to the analysis of health care expenditures*. Journal of Health Economics 2000; 19:259-270.
6. Maciejewski ML, Liu CF, Kavee AL, Olsen MK: *How price responsive is the demand for specialty care?* Health Economics 2012; 21: 902-912.
7. Kowalski A: Censored Quantile Instrumental Variable Estimates of the Price Elasticity of Expenditure on Medical Care, Yale and NBER Working Paper, 2013.
8. Kanavos P and Yfantopoulos J: Cost containment and health expenditure in the European Union: a macroeconomic perspective. in Mossialos E. and Le Grand J. (Eds) Health Care and Cost Containment in the European Union, Asgate London, 1999.
9. Sülkü SN and Caner A: *Health care expenditures and gross domestic product: the Turkish case.* European Journal of Health Economics 2010; 12:29-38.
10. Musgrove P, Zeramdini R and Carrin G: *Basic patterns in national health expenditure.* Bulletin of the World Health Organisation 2002; 80:134-42.
11. Docteur E, Oxley H: Determinants of health-care spending and effects of cost-sharing. OECD Health-Care Systems: Lessons from the Reform Experience, OECD Health Working Papers, No 374, Paris, 2003.
12. Prieto DC and Lago-Peñas S: *Decomposing the determinants of health care expenditure: the case of Spain.* European Journal of Health Economics 2010; 13:19-27.
13. Hartwig J: *What drives health care expenditure? Baumol's model of 'unbalanced growth' revisited*. J Health Economics 2008; 27:603-623.
14. Di Matteo L: *The sustainability of public health expenditures: evidence from the Canadian federation*. European Journal of Health Economics 2010; 11:569-584.
15. Herwartz H and Theilen B: *The determinants of health-care expenditure: new results from semiparametric estimation*. Health Economics 2010; 19:964-978.
16. Bech M, Christiansen T, Khoman E, et al: *Ageing and health care expenditure in EU-15.* European Journal of Health Economics 2010; 12:469-478.
17. Shang B and Goldman D: *Does age or life expectancy better predict health care expenditures?* Health Economics 2008; 17:487-501.
18. OECD Health Data 2010, CD-Rom and Users Guide. OECD: Paris, 2011.
19. Tountas Y, Karnaki P, Pavi E, et al: *The "unexpected" growth of the private health sector in Greece.* Health Policy 2005; 74(2):167-180.
20. Souliotis K and Lionis C: *Creating an integrated health care system in Greece: a primary care perspective,* Journal of Medical Systems 2004; 28(6):643-652.
21. Souliotis K and Kyriopoulos J: *The hidden economy and health expenditures in Greece: measurement problems and policy issues*. Applied Health Economics and Health Policy 2003; 2(3):129-134.
22. Kaitelidou DCh, Tsirona CS, Galanis PA, et al: Informal payments for maternity health services in public hospitals in Greece. Health Policy 2013; 109(1):23-30.
23. Elliot A and Woodward W: Statistical Analysis. SAGE Publications, Thousand Oaks, London, New Delhi, 2007.
24. Athanasakis K, Souliotis K, Kyriopoulos EJ, et al: *Inequalities in access to cancer treatment: an analysis of cross-regional patient mobility in Greece.* Supportive Care in Cancer 2011; 20(3):455-460.
25. Hellenic Statistical Authority. Household Budget Survey. Available at: http://www.statistics.gr/portal/page/portal/ESYE/PAGE-themes?p_param=A0801&r_param=SFA01&y_param=2004_00&mytabs=0. [Retrieved 21 June 2012].
26. Kaitelidou DCh, Tsirona CS, Galanis PA, et al: *Informal payments for maternity health services in public hospitals in Greece.* Health Policy 2013; 109(1):23-30.

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