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"The primary determinants of disease are mainly economic and social, and therefore its remedies must also be economic and social."

(Rose, 1992)

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Abstract

This study investigates the effect of absolute income and relative income on health in the light of medical evidence indicating that the individual's position in the social hierarchy undermines his or her mental and physical health. It uses an instrumental variable estimation methodology that controls for the 'endogeneity' problem to statistically identify the social gradient in physical and mental health. The paper shows that individuals' own income has a positive, but modest effect on health. Absolute income appears to affect only the objective measures of health. Importantly, relative income- as a proxy for social status and position in the social hierarchy - has a significant effect on all measurements of health, with individuals higher in the social ladder enjoying better health. Finally, the results shown that individuals from families that were well-off financially (when at the age of 14) having better physical and mental health.

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Keywords: Income, Social Status, Mental and Physical Health, Childhood Deprivation.

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Introduction

Research has shown an increase in the risks of ill health, disease, disability and premature death with decreasing socio-economic and occupational standing. Hence, the relationship between health and socioeconomic status has received much attention in both the non-economics and, increasingly, economics literatures summarized in Feinstein (1992) and Smith (1999). Furthermore, there is a growing concern among policy makers that these inequalities in health are widening (Wilkinson, 1986, 1994, and Smith, 1999). This large literature is not surprising given the policy importance of understanding the nature of the relationship. Countries with government financed health programmes and countries with a limited institutional involvement in health are finding that it becomes increasingly expensive to supply health services to individuals.

However, it is likely that health affects socio-economic status and vice versa. Hence, the identification of the determinants of the social gradient in health after taking into account the above endogeneity problem is very important, particularly when evaluating policy proposals aimed at alleviating the problems of poor health and low socio-economic status.

The increasing inequality in health should be expected to be particularly visible among the older workforce. The importance of this should not be underestimated. People today live longer due to greater affluence, better health care and advances in medicine and this ageing population may present a major challenge in the near future to the public health care services and policy makers. Furthermore, the health and welfare of the older workforce has an impact on their productive capacity and their ability to provide for themselves in retirement. If poverty and deprivation affect the health status of the aged, then increases in the incidence of the above social evils may increase the health bill of the poorest elements of society at the later and frailer stages of life. Individual hardship aside, this would increase the burden on public health and welfare provision. Furthermore, as the ‘baby boom’ generation now approaches retirement, and hence their decisions regarding post retirement work become imminent, it is very important for policy makers

to identify the mechanics of these relationships in order to guide current and future policy.

This study investigates the effect of absolute income and relative income on health in the light of medical evidence indicating that the individual's position in the social hierarchy undermines his or her mental and physical health (Marmot, 2004) independently of the effect of absolute income. It uses an instrumental variable estimation methodology that controls for the 'endogeneity' problem to statistically identify the social gradient in physical and mental health.

The Data

The empirical analysis in the paper is carried out using some newly collected data, obtained in the SOCIOLD research project. This is a European Commission funded project, conducted in six European countries (UK, France, Finland, Denmark, the Netherlands and Greece), that investigates the socioeconomic and occupational effects on the health inequality of the older workforce[1]. The data collection was targeted on individuals aged between 50 and 65, and the surveys were conducted in the summer-autumn of 2004 through the internet (apart from Greece, where face-to-face interviews took place). The questionnaires aimed to collect new information on issues such as physical and mental health status of older participants of the labour force, past working experiences of individuals, incidence of diseases, individuals' sense of well-being, and their socioeconomic and occupational background.

The survey includes general questions, aimed at identifying individual characteristics of the participants, and is divided into thirteen sub-sections, which cover basic features frequently asked and other, not so commonly used, for the determinants of individual health status. Questions concerning age, gender, marital status, employment status, education and training, occupation and socioeconomic and labour market status characteristics are all included. The respondents are also asked about their social networks and support, their medical conditions and health, current and past investments

[1] Further information on the project can be found at http://www.abdn.ac.uk/sociold/index.hti.

in health, locus of control and health-lifestyle tradeoffs. Furthermore, the participants provided information on their childhood environment that could potential capture early-life deprivation effects on current health status. A detailed description of the variables from the SOCIOLD dataset used in the paper, with some summary statistics, is provided in ***Table A1*** in the Appendix. The sample size is 4021 observations, comprising of 768 respondents from the UK, 772 from Greece, 524 from France, 610 from the Netherlands, 896 from Denmark, and 451 from Finland. Disabled people are excluded from the sample.

In order to explore the effect of socioeconomic parameters on health, we employ three alternative measurements of physical and mental health. We use a *mobility score* variable constructed on individuals' evaluation on how difficulty it is to perform various everyday physical tasks, and individuals' self-assessment on their own health (SAH) as measures of physical health condition. Also based on a series of questions on psychological well-being, we created a score variable to reflect individuals' *mental health* status. A more elaborate description of how these three health variables were constructed can be found in the Appendix.

The Econometric Model

The empirical framework is described by a health production function, where individual health is explained in terms of various socioeconomic characteristics, lifestyles, demographics and other related variables.

$$H = \alpha own\_inc + \beta status + \gamma X' + u \qquad (1)$$

with *own_inc* and *status* denoting individual absolute and relative income, respectively, X representing a vector of the remaining *SES* variables and other covariates[2], and u the error term. The association between income (absolute and relative) and health is considered to be bi-directional (Kuh and Wadsworth, 1993; Martelin, 1994; Goldman *et al.*, 1995; Theodossiou, 1998; Ecob and Davey Smith, 1999; Wagstaff *et al.*, 2001;

[2] Specifically, the regressors vector X includes controls for gender, age, marital status, children in the household, education, employment status, industry sector individual has spent most of his/her life, household income, childhood deprivation, dietary habits and alcohol and smoking consumption, physical activity, club membership, private insurance, Body Mass Index (BMI), genetic loading, and country of residency.

Duncan *et al.*, 2002; Wu, 2003.). Income, either through the acquisition of goods and services (absolute income), or more directly (Marmot, 2004) acting through the brain (relative income) affects health. However, good health can also be an income-producing factor. Therefore, there are two more equations implicit in our analysis:

$$own\_inc = \kappa H + \theta Z' + \varepsilon \qquad (2)$$

$$status = \lambda H + \mu Y' + \omega \qquad (3)$$

with H in the right hand side of both equations, Z and Y the exogenous variables of the models and ε and ω the error terms, respectively. The main equation of interest here is equation (1), the health production. However, in order to estimate the effect of income (absolute and relative) on health, we need to control for the fact that good health may also produce income. After testing for endogeneity, we employ the instrumental variable (IV) approach where equations (2) and (3) are used for the derivation of the auxiliary regressions that are used in the construction of the necessary instrumental variables for the health production equation.

An important condition for the identification of this system of equations is the presence of excluding restrictions, i.e. unique variables (instruments) included in the regressors vectors Z and Y alongside the common variables of X. The instruments are variables that should be relevant, in the sense that must be jointly correlated with the variables that need to be instrumented (*own_inc* and *status*) to a degree that can be shown to be statistically significant. They should also be valid, since they should not be correlated with the error term u in equation (1). Intuitively, the first condition implies that the instruments will contain sufficient information on observed *own_inc* and *status*, which is not contained in the regressors vector X, while the second requirement guarantees that their impact on H in equation (1) is coming exclusively from their correlation with observed *own_inc* and *status*. However, although these statistical properties are important in order to validly estimate the health production model, there must also be an economic reasoning behind the chosen instruments.

The instruments (excluding restrictions) employed for the purpose of our analysis are the following: (a) the household wealth, (b) a control for paying for children's education/private education, (c) whether the individual sees himself as being on a career

path or not, and (d) whether the individual feels that his/hers own income is not enough to make "ends meet". The general intuition behind the chosen variables is that they reflect individuals' financial status, which could be associated directly with their own income. In order to statistically examine the relevance of the instruments used an F-test of their joint significance in the first-stage regressions (equations 2 and 3) is employed. If the chosen excluding restrictions are "weak", i.e. have little explanatory power then the bias in the estimated IV coefficients is expected to increase (Hahn and Hausman, 2002). Stock and Yogo (2002) provide the tables of the critical values for testing the presence of weak instruments. The critical value is a function of the number of included endogenous regressors (*own_inc* and *status* in our case), the number of instrumental variables (5 used here), and the desired maximal bias of the IV estimator relative to OLS (for a full discussion: Stock and Yogo, 2002). ***Table 1*** presents the joint significance F-tests performed for equations (2) and (3). The test rejects the weak instruments hypothesis if the F-statistic exceeds the critical value. According to the Stock and Yogo tables, even if we were to tolerate only a 5% relative bias or size of distortion (critical value: 13.97), the weak instruments hypothesis is rejected in both equations.

TABLE 1: TESTING THE RELEVANCE AND VALIDITY OF IV

Weak identification test			
(First stage)	***own_income***		***status***
Joint significance of IVs	19.40		38.03
F(5, 3982)	(.000)		(.000)
Overidentification test			
(Second stage)	***mobility score***	***SAH***	***mental health***
Sargan test	2.609	4.685	2.032
Chi-sq(3)	(.456)	(.196)	(.566)

Note: p-values into brackets

Regarding the second requirement, the instruments independence from the error process, the Sargan over-identification test is used. This statistic, which equals the number of observations minus the degree of freedom, times R^2, follows the Chi-square distribution. A rejection of the null hypothesis (of correct model specification and orthogonality conditions) casts doubt on the validity of the instrumental variables, since they are either not truly exogenous or incorrectly excluded from the equation. The performed Sargan tests in ***Table 1***, for the three alternative measures of health, suggests that the instruments are not jointly exerting any traceable direct influence on health, since they are not correlated to the error process *u*.

TABLE 2: HEALTHY EATING ENDOGENEITY TESTS

	mobility score	***SAH***	***mental health***
Wu-Hausman	5.535	15.874	13.400
F(2, 3983)	(.004)	(.000)	(.000)
Durbin-Wu-Hausman	11.145	31.797	26.875
Chi-sq(2)	(.004)	(.000)	(.000)

Note: p-values into brackets

Before continuing to the IV estimates of the health production models, it is important that we first formally establish the presence of endogeneity bias. Since, the IV estimator always has a larger asymptotic variance than the OLS estimator, there is loss of

efficiency in the former approach. For that reason it is essential that we assess the necessity to resort to instrumental variables. Here we employ two alternative, asymptotically equivalent, tests, the Durbin-Wu-Hausman and the Wu-Hausman to examine whether OLS is inconsistent and IV is required (***Table 2***). The null hypothesis states that OLS estimator would yield consistent estimates, suggesting that this is the appropriate estimation technique. A rejection of the null hypothesis would imply that the endogenous regressors' effects on the estimates are meaningful and therefore the IV estimator is needed. For all three alternative health production equations the performed tests reject the null hypothesis, i.e. suggest the endogeneity of *own_inc* and *status* in equation (1) and as a result justify the choice of the instrumental variables approach.

The Empirical Results

The IV estimates of the three health production functions, presented in ***Table 3***[3], highlight the importance of socioeconomic factors on individuals' health and well-being. As the discussion below will suggest, through different pathways, past and present deprivation as well as individuals' position on social hierarchy have a significant effect on people's physical and mental health.

Beginning the analysis with the impact of individuals' (absolute) income on their own health, the results provide evidence of the *"absolute-income hypothesis"* (Wagstaff and van Doorslaer, 2000). Income, through the exposure to better material conditions and the access to higher quality health services, is expected to have a positive effect on individuals' health. Indeed, after controlling for the fact that individual health may also affect individuals' labour market behaviour and consequently income, individuals' own income is estimated to have a positive, but modest in terms of magnitude and statistical significance, effect on health. Interestingly, absolute income appears to affect only the objective measures of health where the obtained elasticities of income on the mobility score and mental health are 8 percent and 3 percent, respectively, but not the subjective, self-assessed health.

[3] The first-stage regression estimates on absolute and relative income are provided in the Appendix, ***Table A2***.

Individuals' financial circumstances have an impact on health through the direct physical effects of exposure to better or worse material conditions. However, social status, people's relative position, is also linked to health. Marmot *et al.* (1984, 1991) in the Whitehall studies on British civil servants argue that there is a social gradient in health, evident across the whole social hierarchy. Health appears to be a matter of position in the social hierarchy, suggesting some concept of relative rather than just absolute deprivation. According to Marmot' *"Status Syndrome"* (2004), the mechanism through which status affects health is low grade chronic stress. Marmot argues that social status is related to both the control one has over his/her own life and the level of participation in the society. Individuals at the bottom of the social hierarchy experience higher levels of stress due to their inability to control their lives or to participate fully in all that society has to offer. Low grade chronic stress, acting through the brain, mobilizes hormones which affect the cardiovascular and immune systems. Therefore, chronic anxiety, insecurity, low self-esteem, social isolation and lack of control over work appear to undermine mental and physical health.

In order to assess the importance of the *"relative-position hypothesis"*, as described by Wagstaff and van Poorslaer (2000), we include in the regressors vector, along with absolute income, a control of individuals' relative, among comparable individuals of similar professional standing, income. This variable can be interpreted as a reflection of individuals' social status and position in the social hierarchy. Relative income is estimated to have a significant effect on all measurements of health, with individuals higher in the social ladder enjoying better health. An interesting point here is that although both absolute and relative income have a positive effect on health, the latter is found to be stronger in terms of statistical significance, highlighting the existence of a social gradient in health, and the role of social status and individuals' position on the social hierarchy on physical and mental health.

TABLE 3: IV ESTIMATES (SECOND STAGE)			
	mobility score	***SAH***	***mental health***
Demographics			
male	0.034	-0.016	-0.018
	(0.034)	(0.018)	(0.015)
age	-0.006**	-0.003***	0.001
	(0.003)	(0.001)	(0.001)
married	0.118*	-0.000	0.007
	(0.037)	(0.020)	(0.016)
child16	0.079**	0.030	-0.007
	(0.035)	(0.019)	(0.015)
Socioeconomics			
own_inc	0.080**	0.027	0.029**
	(0.034)	(0.018)	(0.015)
status	0.183*	0.205*	0.132*
	(0.060)	(0.033)	(0.026)
educ_2	0.017	-0.017	-0.042**
	(0.044)	(0.024)	(0.019)
educ_3	0.063	-0.013	-0.013
	(0.041)	(0.023)	(0.018)
educ_4	0.041	-0.008	-0.039**
	(0.041)	(0.022)	(0.018)
employed	-0.128	-0.030	-0.063
	(0.104)	(0.057)	(0.045)
retired	-0.537*	-0.016	-0.095**
	(0.093)	(0.051)	(0.040)
agric_etc	0.194*	0.024	0.006
	(0.072)	(0.039)	(0.031)
transport_etc	0.015	0.009	0.001
	(0.044)	(0.024)	(0.019)
banking	0.015	0.023	0.007
	(0.046)	(0.025)	(0.020)
other_services	0.021	-0.012	-0.001
	(0.032)	(0.017)	(0.014)
never_empl	0.028	0.070	0.040
	(0.102)	(0.056)	(0.044)
rest_inc	0.000	0.006***	0.002
	(0.006)	(0.003)	(0.002)
well_off	0.046***	-0.016	0.035*
	(0.025)	(0.013)	(0.011)

Table 3 *continued*

Table 3 *continued*

	mobility score	***SAH***	***mental health***
Lifestyles and other related			
smoke_now	-0.081***	-0.028	-0.010
	(0.044)	(0.024)	(0.019)
coffee_tea	-0.002	-0.003	-0.001
	(0.005)	(0.003)	(0.002)
meat	-0.048	-0.039**	-0.013
	(0.032)	(0.018)	(0.014)
fish	0.002	0.005	0.011
	(0.025)	(0.014)	(0.011)
veggie	0.065**	0.011	0.014
	(0.026)	(0.014)	(0.011)
alcoh_0	-0.187*	-0.023	-0.022
	(0.032)	(0.017)	(0.014)
alcoh_00	0.023	-0.011	-0.022
	(0.031)	(0.017)	(0.013)
exercise	0.349*	0.024***	0.048*
	(0.025)	(0.014)	(0.011)
member_of	0.031	0.011	0.017
	(0.030)	(0.016)	(0.013)
priv_insur	0.074*	-0.019	0.003
	(0.029)	(0.016)	(0.012)
bmi	-0.029*	-0.007*	-0.001
	(0.002)	(0.001)	(0.001)
genetics	-0.166*	-0.040**	-0.020
	(0.030)	(0.016)	(0.013)
Country of residence			
UK	-0.165*	0.044	-0.047***
	(0.060)	(0.033)	(0.026)
GR	0.308*	0.108*	-0.063**
	(0.063)	(0.034)	(0.027)
FR	0.598**	0.349**	0.280**
	(0.290)	(0.159)	(0.126)
NL	-0.337*	-0.481*	-0.017
	(0.064)	(0.035)	(0.028)
DK	-0.272*	0.024	-0.027
	(0.049)	(0.027)	(0.021)
constant	0.949*	1.244*	1.107*
	(0.270)	(0.148)	(0.117)

Note: Standard errors in parentheses *** significant at 10%; ** significant at 5%; * significant at 1%

The interaction of the child's development with the social environment forms the basis of the individual's biological, psychological and human capital. Since poverty and social inequality adversely affect children's health and development, and health in early life is the basis of health in adult life, we would expect that childhood deprivation would have also an adverse effect on health later on in life. A number of studies have actually demonstrated the long-term influence of childhood socio-economic circumstances on adult, particularly cardiovascular, health (Notkola *et al.*, 1985; Gliksman *et al.*, 1995; Brunner *et al.*, 1999; Wamala *et al.*, 2001; Lawlor *et al.*, 2002). Our findings from the estimated health production functions support that, with individuals from families that were well-off financially (when at the age of 14) having better physical and mental health.

In the pooled regression estimates of the three health production functions we also control for other individual characteristics, lifestyles and country-specific effects. Although a detailed discussion on these results would exceed the purpose of this paper, we briefly comment on some findings. One thing that we should acknowledge first is that some of the explanatory variables, particularly lifestyle-related variables, while in the model are assumed to be exogenous, they may actually be simultaneously determined with individuals' health. This could potentially explain why individuals' dietary habits, smoking and alcohol consumption levels are found to have a quite limited effect on health. A healthy diet is expected to improve health, but also individuals with poor health condition may adopt healthier lifestyles as a way to remedy that. Therefore, there is a two-way relationship between health and lifestyles that when it is not disentangle (probably with the use of instruments) is likely to show little correlation between them, as these two effects (lifestyles on health and health on lifestyles) work to opposite directions and may be cancelled out[4].

Individuals with unfavorable genetic loading, i.e. whose first-degree relatives suffered from cardiovascular, malignant growth, diabetes, or blood pressure, are estimated to have poorer physical health. Also a negative relationship between BMI and physical health is found, although the causation of this pattern is not explored in the paper. Furthermore,

[4] For a more detailed discussion on this issue look Goode *et al.* (2004).

younger people appear to have better health and physical activity/exercise is estimated to improve both physical and mental health (despite the potential endogeneity bias explained above, at least in the case of physical health). Finally, regarding the country-specific effects, captured by the country dummies in the health production functions, individuals in France and Greece seem to have better physical health, followed by those in Finland, the UK, Denmark and lastly those in the Netherlands. French people appear to have better mental health compared to the rest, while Greeks and British are found at the other end of the spectrum.

Conclusions

This study investigates the effect of absolute income and relative income on health in the light of medical evidence indicating that the individual's position in the social hierarchy undermines his or her mental and physical health. It uses an instrumental variable estimation methodology that controls problem to statistically identify the social gradient in physical and mental health.

After controlling for 'endogeneity', that is for the fact that individual health may also affect individuals' labour market behaviour and consequently income, this paper shows that individuals' own income has a positive, but modest effect on health. Absolute income appears to affect only the objective measures of health. Importantly, relative income- as a proxy for social status and position in the social hierarchy - has a significant effect on all measurements of health, with individuals higher in the social ladder enjoying better health. Finally, the results shown that individuals from families that were well-off financially (when at the age of 14) having better physical and mental health

The authors conclude that these findings imply a mechanism through which status affects health probably through low grade chronic stress (Marmot' "Status Syndrome" (2004)). Social status is related to both the control one has over his/her own life and the level of participation in the society. Individuals at the bottom of the social hierarchy experience higher levels of stress due to their inability to control their lives or to participate fully in all that society has to offer. Hence, policies should focus on eliminating 'social

exclusion' and reduce income inequality as they appear to cause chronic anxiety, insecurity, low self-esteem, social isolation and lack of control over work appear to undermine mental and physical health. The "Status Syndrome" effect can by counteracted by the Social support, and full participation in Society. As Marmot (2004) put it being a member of a 'fractured society adds the insult of low social participation to the injury of low control over life'.

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Appendix

Construction of variables

Mobility score

The respondents were asked nine questions regarding how difficult they found performing the following tasks: (1) bathing and dressing themselves, (2) walking one block, (3) walking several blocks, (4) walking more than a mile, (5) bending, kneeling or stooping (6) climbing one flight of stairs, (7) lifting or carrying groceries, (8) doing moderate physical activities, (9) doing rigorous physical activities. A score was created by adding the values/responses to those questions (1: not at all difficult; up to 3: very difficult) and then taking the z-score and logarithmic transformation of it. The mobility score used is that logarithm multiplied by minus one so that high score values would reflect lower difficulty in mobility, i.e. better physical health.

Self-assessed health (SAH)

Individuals were asked to assess their own health on the whole over the last 12 months. Responses ranged from very bad (1) to very good (5). This variable was transformed to a continuous variable, based on a z-score transformation, and then its logarithm was used as a self-assessed health variable. High values reflect better health.

Mental health

Regarding the individuals' mental well-being, respondents were asked to comment on whether they have been feeling as if they are (a) enjoying they things they used to enjoy, (b) looking forward with enjoyment to things, (c) laughing and seeing the funny side of things, and (d) less irritable. Their answers ranged from *much less than usual* (1) to *much more than usual* (5). A score based on individuals' answers to these questions was created and, similar to the SAH variable, it was transformed using the z-score and then its logarithm was used as the mental health variable, where high values reflect better mental health.

TABLE A1: VARIABLE DESCRIPTION AND STATISTICS		
Variable	***Mean***	***Description***
Health variables		
mobility score	.446 (.801)	A mobility score, high values reflect better physical health status (logarithm)
SAH	1.051 (.409)	Self-assessed health, high values reflect better physical health status (logarithm)
mental health	1.354 (.302)	A mental health score, high values reflect better mental health status (logarithm)
bmi	27.534 (5.181)	Body Mass Index: weight in kg over square of height in meters
genetics	.810	Genetic loading: 1 if individual belongs in dangerous group (i.e. if any of their first-degree relatives ever suffered from cardiovascular, malignant growth, diabetes, or blood pressure), 0 otherwise
Socio-economic variables		
Income and wealth		
own_income	8.094 (4.025)	Total own 2003 income from all sources (including unemployment, disability or other benefits, pensions, investments and dividends) after tax and other deductions, PPP adjusted (logarithm)
status	.025 (.929)	Relative income status to individuals of similar professional standing and characteristics (z-score transformation)
rest_income	7.685 (4.189)	Rest of 2003 household income (excluded own) from all sources (including unemployment, disability or other benefits, pensions, investments and dividends) after tax and other deductions, PPP adjusted (logarithm)
well_off	.625	1 if individual's family was well-off at the age of 14, 0 otherwise
wealth_hld_0	.538	1 if household wealth is up to $1000, 0 otherwise
wealth_hld_1	.230	1 if household wealth is between $1001 and $55000, 0 otherwise
wealth_hld_2	.233	1 if household wealth is above $55000, 0 otherwise
wealth_3	.245	1 if individual is paying for children's education or private school, 0 otherwise
wealth_5	.299	1 if individual sees him/herself being on a career path, 0 otherwise
wealth_6	.429	1 if individual feels that own income is not enough to make "ends meet" , 0 otherwise

Table A1 *continued*

Table A1 *continued*

Variable	***Mean***	***Description***
Education		
educ_1	.276	1 if individual's education is up to secondary, 0 otherwise
educ_2	.161	1 if individual's education is upper-secondary, 0 otherwise
educ_3	.165	1 if individual's education is post-secondary, non-tertiary, 0 otherwise
educ_4	.387	1 if individual's education is a university degree or above, 0 otherwise
Employment status		
employed	.637	1 if individual is employed (full-time, part-time employee or self-employed), 0 otherwise
retired	.199	1 if individual is retired, 0 otherwise
jobless	.163	1 if individual is jobless, 0 otherwise
Industry sector		
manuf_etc	.180	1 if industry sector, individual has spent most of his/her life, is manufacturing or construction, 0 otherwise
agric_etc	.030	1 if industry sector, individual has spent most of his/her life, is agriculture, fishery or energy and water supply, 0 otherwise
transport_etc	.114	1 if industry sector, individual has spent most of his/her life, is distribution and catering or transport and communication, 0 otherwise
banking	.107	1 if industry sector, individual has spent most of his/her life, is banking, finance or insurance, 0 otherwise
other_services	.532	1 if industry sector, individual has spent most of his/her life, is other services, 0 otherwise
never_empl	.036	1 if individual has never been employed, 0 otherwise
Demographics		
male	.513	1 if individual is male, 0 otherwise
age	55.788 (5.704)	Age of individual in 2004
married	.802	1 if individual is married or living with a partner, 0 otherwise
child16	.150	1 if children under 16 are present in household, 0 otherwise

Table A1 *continued*

Table A1 *continued*

Variable	***Mean***	***Description***
Lifestyles & other related		
smoke_now	.797	1 if individual is currently a smoker, 0 otherwise
coffee_tea	4.162 (2.649)	Daily consumption of coffee and tea (number of cups)
meat	.796	1 if individual eats more than 2 times per week meat, 0 otherwise
fish	.371	1 if individual eats more than once per week fish, 0 otherwise
veggie	.692	1 if individual eats more than 6 times per week vegetables and fruits, 0 otherwise
alcoh_0	.274	1 if individual has zero alcohol consumption, 0 otherwise
alcoh_12	.522	1 if individual has up to 12 units of alcohol per week, 0 otherwise
alcoh_00	.198	1 if individual has more than 12 units of alcohol per week, 0 otherwise
exercise	.482	1 if individual regularly exercises (2 or more times per week), 0 otherwise
member_of	.666	1 if individual is a member of any kind of club, 0 otherwise
priv_insur	.295	1 if individual has a private health insurance, 0 otherwise
Country of residence		
UK	.191	1 if individual's country of residency is the UK, 0 otherwise
GR	.192	1 if individual's country of residency is Greece, 0 otherwise
FR	.130	1 if individual's country of residency is France, 0 otherwise
NL	.152	1 if individual's country of residency is Netherlands, 0 otherwise
DK	.223	1 if individual's country of residency is Denmark, 0 otherwise
FIN	.112	1 if individual's country of residency is Finland, 0 otherwise
Observations	4021	

TABLE A2: FIRST STAGE ESTIMATES		
	own_income	***status***
Demographics		
male	0.674*	-0.002
	(0.074)	(0.030)
age	0.022*	-0.000
	(0.008)	(0.003)
married	0.031	0.047
	(0.110)	(0.044)
child16	0.220**	0.002
	(0.105)	(0.042)
Socioeconomics		
educ_2	0.629*	0.071
	(0.112)	(0.045)
educ_3	0.458*	0.002
	(0.113)	(0.045)
educ_4	0.536*	0.033
	(0.104)	(0.041)
employed	2.807*	0.188*
	(0.107)	(0.043)
retired	2.474*	0.194*
	(0.125)	(0.050)
agric_etc	0.061	-0.032
	(0.216)	(0.086)
transport_etc	0.018	0.081
	(0.131)	(0.052)
banking	0.228***	0.008
	(0.136)	(0.054)
other_services	0.010	0.024
	(0.096)	(0.038)
never_empl	-2.102*	0.078
	(0.213)	(0.085)
rest_income	-0.125*	0.002
	(0.011)	(0.004)
well_off	-0.003	0.060**
	(0.073)	(0.029)
Lifestyles and other related		
smoke_now	-0.044	-0.011
	(0.131)	(0.052)
coffee_tea	-0.013	-0.001
	(0.015)	(0.006)
meat	0.183***	0.071***
	(0.095)	(0.038)

Table A2 *continued*

Table A2 *continued*

	own_income	***status***
fish	-0.126***	0.039
	(0.075)	(0.030)
veggie	0.005	0.021
	(0.077)	(0.031)
alcoh_0	-0.332*	0.015
	(0.087)	(0.035)
alcoh_00	0.071	0.043
	(0.092)	(0.037)
exercise	0.036	-0.007
	(0.076)	(0.030)
member_of	0.217**	-0.013
	(0.086)	(0.035)
priv_insur	0.066	-0.012
	(0.085)	(0.034)
bmi	-0.013***	0.003
	(0.007)	(0.003)
genetics	0.126	0.022
	(0.089)	(0.036)
Country of residence		
UK	0.043	-0.233*
	(0.174)	(0.069)
GR	-0.944*	0.001
	(0.176)	(0.070)
FR	-8.374*	-0.389*
	(0.170)	(0.068)
NL	0.659*	0.604*
	(0.174)	(0.070)
DK	0.174	0.204*
	(0.143)	(0.057)
Instrumental variables		
wealth_hld_0	-0.380*	-0.185*
	(0.096)	(0.038)
wealth_hld_1	-0.278*	-0.245*
	(0.104)	(0.041)
wealth_3	-0.163***	0.086**
	(0.096)	(0.038)
wealth_5	0.701*	-0.058***
	(0.080)	(0.032)
wealth_6	0.072	-0.352*
	(0.077)	(0.031)
constant	6.150*	-0.160
	(0.555)	(0.222)
R-squared	0.711	0.135

Note: Standard errors in parentheses *** significant at 10%; ** significant at 5%; * significant at 1%