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Unemployment and health: a panel event study

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Abstract

Adopting a panel event study framework, we estimate the effect of unemployment on health outcomes by exploiting the variation in the timing of entering unemployment using longitudinal data for Greece. We find, that in the periods ahead of an unemployment event, health outcomes decline and unmet needs for medical care increase. These findings are valid only for men and are robust to alternative definitions of health outcomes, unemployment events and model specifications.

Keywords: Unemployment flows, Self-assessed health, Panel event study.

JEL Classification: J6, I14, C23.

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I. Introduction

The relationship between unemployment and health has been examined extensively but results are yet inconclusive. Colman and Dhaval (2018) using the typical model for the demand for health (Grossman, 1972) advocate that the own realization of an unemployment event may alter health behaviors through shifts in income and time constraints. In this context, researchers use longitudinal data to define treated (becoming jobless) and not treated units (not becoming jobless), to investigate whether the health stock of the former deteriorates in the period after this episode using as a counterfactual scenario the evolution of health outcomes of the latter in both periods. However, a two-period framework (before/after) imposes strong identification assumptions regarding the timing of entering unemployment which varies between individuals. Empirical evidence shows that entering unemployment may or may not cause a deterioration of health outcomes (e.g., Cygan et al., 2017; Schmitz, 2011). In this paper, we exploit the individual variation regarding the timing of entering unemployment and we adopt a panel event study framework to examine the responsiveness of health outcomes on unemployment inflows.

We use longitudinal data from the European Statistics of Income and Living Conditions (EU-SILC) for Greece (period 2003-2020). The dataset includes information on health and labor market outcomes and on demographic, human capital and economic variables. Greece is considered to be an interesting case to investigate the health-unemployment nexus due to the prolonged economic crisis (2008-2014) with extremely high unemployment rates (reaching 28% in 2013) and significant income reductions (around 25% income loss during 2012). For analytical purposes we identify post unemployment periods depending on the timing of entering unemployment and we use several health outcomes (i.e., self-rated health, very good/good health, productive health units, unmet needs for medical care, chronic conditions and health limitations). Fixed effects model specifications are adopted (static and dynamic) to overcome issues related to unobserved time-invariant factors that may affect health outcomes and/or unemployment inflows. Also baseline outcomes are allowed to interact with linear time trends (Schaller and Stevens, 2015). Estimations are carried out separately for men and women due to gender differences in labor market attachment. The results show that health decreases in the periods following an unemployment episode but only for men. We also report rising unmet needs for medical care after entering into unemployment.

II. Data

EU-SICL is rotated micro-level panel dataset administered by the Hellenic Statistical Authority (ELSTAT) and covers the period 2003-2020. Individuals are observed for a maximum of four consecutive years (14 waves). Health status refers to self-assessed health ratings (1: very good, 2: good, 3: fair, 4: bad, 5: very bad) which is reversed to accommodate the notion that health stock deteriorates with age. For analytical purposes three indices are constructed i.e., a [0,1] normalized index (with 1 and 5 to be the minimum and maximum, respectively), a dummy indicator for very good/good health, and a proxy for productive health units. The latter is developed following Grossman (1972) and Dench and Grossman (2019) by adjusting for the productive time lost due to illness. To do so, we use the National Health Survey (NHS) administrated by ELSTAT and pool cross-sectional data for the years 2009, 2014 and 2019. NHS applies the same rating (as in EU-SILC) for self-assessed health but also includes information on the number of weeks lost per year due to illness. For each health rating we calculate the average weeks lost due to illness and then measure the log-distance from the worse health rating (i.e., very bad health). These values are then imposed to the self-assessed health ratings in the EU-SILC. Additionally, for each individual in the EU-SILC we define dummy indicators regarding unmet needs for medical care, suffering from chronic conditions and health limitations. Furthermore, we define unemployment inflows between two consecutive EU-SILC surveys using the reported unemployment status. Since self-assessed health is reported in each year, we also use the recalled unemployment status (i.e., unemployment status for each month of the previous year) but only for the baseline wave (June status) to define unemployment inflows. Therefore, for the entire period and for each individual we create a dummy indicator denoting the years following the first unemployment episode.

For analytical purposes we select individuals aged 25-54 who are observed over a period of 4-years in each wave. Data show that during the examined period unemployment rates has exploded from a 5% to 30% during the period 2008-2013 and in this period self-assessed health seems to further deteriorate away from its long-run trend (see Figure A1 in the Appendix). Figure 1 shows that individuals undergo an income (household income after taxation and welfare transfers) reduction and a rise in non-work time in the period following the event, indicating that income and time constraints are indeed altered after an unemployment event.

[Figure 1]

Table 1 presents summary statistics regarding the average health behavior and other correlates around an unemployment event. It appears that health decreases in the period after the first unemployment event and especially for men. This is not the case for chronic conditions and health limitations, implying no reverse causality between unemployment and physical health.

[Table 1]

III. Empirical model

We adopt a panel event study framework design where the variation in outcomes around an event is compared with that in a baseline period (prior to the event). We first examine the impact of an unemployment event on health by estimating a static model of the form:

$$y_{it} = \alpha + \beta z_{it} + \lambda_i + \mu_t + \Pi X'_{it} + \varepsilon_{it} \quad (1)$$

where y_{it} is the health outcome of individual i at time t , z_{it} a dummy indicator for the periods following an unemployment inflow, λ_i the individual fixed effect, μ_t the time fixed effect, X'_{it} the set of additional controls and $\varepsilon_{i,t}$ the unobserved error term. We also estimate a dynamic model of the form:

$$y_{it} = \alpha + \sum_{j=2}^J \beta_j Lag_{it}^j + \sum_{k=1}^K \gamma_k Lead_{it}^k + \lambda_i + \mu_t + \Pi X'_{it} + \varepsilon_{it} \quad (2)$$

where Lag_{it}^j and $Lead_{it}^k$ are the j -lag and κ -lead set of dummies denoting the time distance away from the event and β_j and γ_k are the corresponding parameters to be estimated.

IV. Estimation results

Table 2 presents a summary of the population weighted estimates related to equation (1) for three different subsamples (unrestricted, excluding individuals who are re-employed or entering inactivity after the event). The full set of estimates are presented in Tables A1, A2 and A3 (Appendix). The results show a negative impact of becoming unemployment on all measures of self-assessed health but only for men (no effect is found for women). For instance, after the occurrence of an unemployment event the health stock (adjusted for the weeks lost due to illness) is reduced by 4.3 percentage points. This finding remains intact when re-employment or inactivity entry are not considered as treated units. We also report that the probability of unmet needs for medical care increases by almost 3 percentage points after the unemployment event. In contrast, the unemployment effect on other health outcomes (chronic conditions and health limitations) is not statistically different from zero.

[Table 2]

Figure 2 presents population weighted estimates (adjusted health) related to equation (2). We observe that in the case of men, health deteriorates in the years following an unemployment event and there is no visual sign that there are pre-event differences in the health outcome between those with and without unemployment entry experiences. This does not seem to be the case for women.

[Figure 2]

V. Conclusions

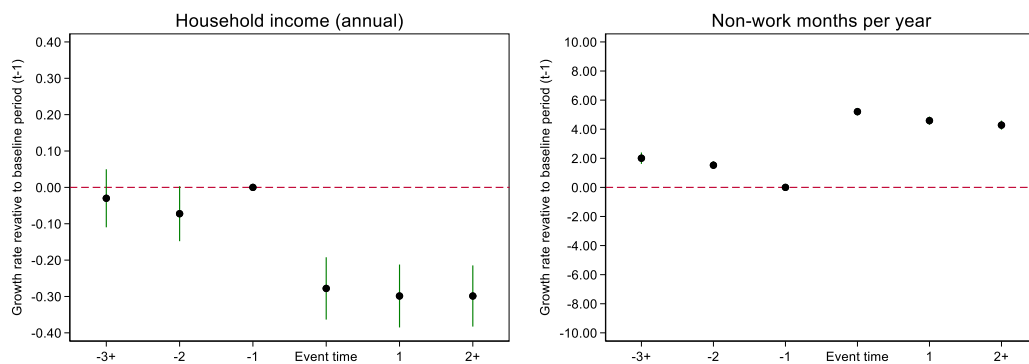
In this paper we estimate the impact of entering unemployment on health outcomes using longitudinal data at the individual level. We find that self-assessed health and unmet needs for medical care deteriorate in the periods after an unemployment event. These findings are valid for men but not for women. No effect is found for other health outcomes (chronic conditions and health limitations). Using a panel event study design seems to be an effective empirical tool to identify the impact of labor market shocks on health outcomes taken into consideration that pre-event trends may affect this relationship and that this impact may be realized in periods ahead of the shock.

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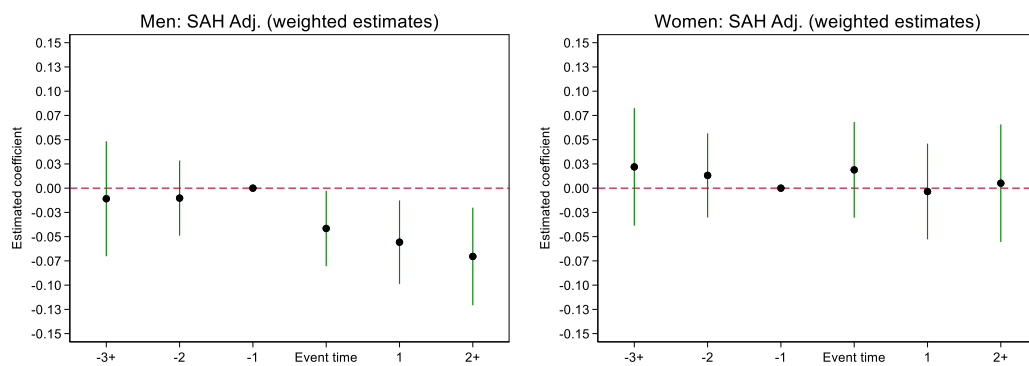
Figures

Figure 1. Income and time constraints around an unemployment event



Source: EU-SILC (2003-2020, public use files), Hellenic Statistical Authority (ELSTAT).

Figure 2. The impact of unemployment on self-assessed health



Source: EU-SILC (2003-2020, public use files), Hellenic Statistical Authority (ELSTAT).

Notes: Detailed results are available upon request.

Tables

Table 1. Summary statistics

	Men						Women					
	t-3+	t-2	t-1	event	t1	t2+	t-3+	t-2	t-1	event	t1	t2+
Unemployment	.10	.17	0	1	.57	.46	.13	.16	0	1	.56	.43
Self-assessed health (normalized)	.89	.89	.90	.88	.88	.88	.88	.89	.88	.89	.89	.89
Self-assessed health (good/very good)	.92	.92	.94	.91	.92	.92	.91	.91	.90	.92	.91	.92
Self-assessed health (adjusted)	2.40	2.41	2.43	2.38	2.37	2.37	2.37	2.38	2.38	2.41	2.40	2.38
Unmet medical care	.06	.07	.07	.09	.10	.10	.08	.09	.10	.12	.10	.10
Chronic conditions	.08	.09	.06	.07	.08	.08	.09	.10	.08	.10	.08	.07
Health limitations	.07	.08	.06	.06	.07	.07	.08	.07	.07	.08	.07	.06
Age	40.0	38.1	38.3	39.5	39.4	39.4	40.1	37.3	37.4	38.7	38.7	39.1
Native-born	.91	.83	.83	.82	.83	.84	.89	.84	.84	.84	.82	.80
Married	.63	.52	.51	.53	.51	.46	.77	.59	.63	.66	.67	.66
Years of schooling	12.0	11.3	11.3	11.3	11.3	11.5	12.1	12.3	12.3	12.5	12.2	12.2

Source: EU-SILC (2003-2020, public use files), Hellenic Statistical Authority (ELSTAT).

Notes: The category (t-3+) corresponds individuals without any unemployment event.

Table 2. The impact of becoming unemployed on health outcomes.

Dependent variable	[1]		[2]		[3]	
	Post-unemployment period (first episode and onwards)		Post-unemployment period (no employment entry)		Post-unemployment period (no inactivity entry)	
	Men	Women	Men	Women	Men	Women
Self-assessed health (normalized)	-.014** (.006)	.002 (.008)	-.018** (.008)	.001 (.008)	-.013** (.006)	.005 (.008)
Self-assessed health (good/very good)	-.023** (.011)	.006 (.013)	-.037*** (.015)	.002 (.014)	-.021** (.011)	.007 (.013)
Self-assessed health (adjusted)	-.043** (.019)	.004 (.021)	-.052** (.025)	-.001 (.025)	-.039** (.019)	.015 (.023)
Unmet medical care	.028** (.013)	.022 (.014)	.025 (.017)	.028* (.016)	.029** (.013)	.022 (.014)
Chronic conditions	.004 (.009)	.017 (.013)	.012 (.013)	.014 (.017)	.003 (.009)	.010 (.013)
Health limitations	-.003 (.008)	.008 (.011)	.001 (.011)	.008 (.014)	-.004 (.009)	.007 (.011)
Individuals	10,956	11,663	10,956	11,663	10,956	11,663
Observations	43,824	46,652	43,824	46,652	43,824	46,652

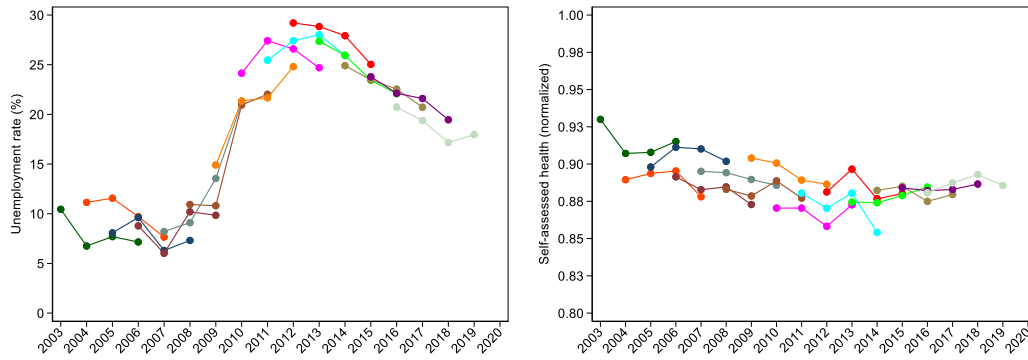
Source: EU-SILC (2003-2020, public use files), Hellenic Statistical Authority (ELSTAT).

Notes: Detailed estimates are presented in Tables A1, A2 and A3 in the Appendix.

Statistical significance: ***at 1%, ** at 5%, * at 10%.

Appendix

Figure A1. Unemployment and self-assessed health



Source: EU-SILC (2003-2020, public use files), Hellenic Statistical Authority (ELSTAT).

Notes: Each line refers to a given wave.

Table A1. The impact of becoming unemployed on health outcomes (baseline model)

	[1]		[2]		[3]		[4]	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
Women (Individuals: 11,663; Observations: 46,652)								
Self-assessed health (normalized)	-.003 (.005)	-.002 (.008)	-.001 (.006)	.002 (.008)	-.001 (.006)	.003 (.008)	-.001 (.005)	.002 (.008)
Self-assessed health (good/very good)	.004 (.009)	.003 (.013)	.004 (.009)	.003 (.013)	.004 (.009)	.006 (.013)	.003 (.009)	.006 (.013)
Self-assessed health (adjusted)	-.010 (.016)	-.008 (.023)	-.003 (.017)	.007 (.024)	-.003 (.017)	.008 (.024)	-.002 (.015)	.004 (.021)
Unmet medical care	-.002 (.011)	.010 (.015)	.006 (.011)	.0011 (.015)	.006 (.011)	.010 (.015)	.019** (.009)	.022 (.014)
Chronic conditions	.005 (.008)	.021 (.013)	.007 (.009)	.023 (.014)	.008 (.009)	.022 (.014)	.006 (.008)	.017 (.013)
Health limitations	-.002 (.008)	.015 (.011)	.003 (.008)	.017 (.011)	.003 (.008)	.015 (.011)	.001 (.007)	.008 (.011)
Men (Individuals: 10,956; Observations: 43,824)								
Self-assessed health (normalized)	-.022*** (.005)	-.021*** (.007)	-.020*** (.005)	-.018** (.007)	-.020*** (.005)	-.018*** (.006)	-.016*** (.004)	-.014** (.006)
Self-assessed health (good/very good)	-.018** (.008)	-.025** (.011)	-.021** (.008)	-.025** (.011)	-.021** (.008)	-.025** (.011)	-.017** (.008)	-.023** (.011)
Self-assessed health (adjusted)	-.069*** (.015)	.064*** (.021)	-.062*** (.015)	-.052** (.021)	-.060*** (.015)	-.051** (.021)	-.048*** (.014)	-.043** (.019)
Unmet medical care	.013 (.010)	.028** (.014)	.023** (.010)	.029** (.014)	.020** (.010)	.023* (.014)	.028*** (.008)	.028** (.013)
Chronic conditions	.007 (.007)	.008 (.010)	.010 (.007)	.010 (.010)	.008 (.008)	.008 (.010)	.003 (.007)	.004 (.009)
Health limitations	-.003 (.008)	-.006 (.009)	.003 (.008)	.001 (.010)	-.001 (.008)	-.003 (.010)	-.002 (.007)	-.003 (.008)
Controls × time trend								
Age dummies	-	-	√	√	√	√	√	√
Additional controls	-	-	-	-	√	√	√	√
Self-assessed health	-	-	-	-	-	-	√	√
Chronic conditions	-	-	-	-	-	-	√	√
Health limitations	-	-	-	-	-	-	√	√
Unmet medical care	-	-	-	-	-	-	√	√

Source: EU-SILC (2003-2020, public use files), Hellenic Statistical Authority (ELSTAT).

Notes: Reported numbers are estimated coefficients of a dummy indicator that takes the value of 1 for the upcoming periods that follow the first unemployment event for each individual and 0 otherwise and are drawn from fixed-effects model specifications. Additional controls refer to gender, native-born, marital status, region of residence, the years of completed schooling, chronic conditions, health limitations, unmet needs for medical care and the baseline year of each wave. All controls refer to variables from the baseline year of each wave interacted with a wave-specific linear time trend. The annual local male unemployment rate and is also included in the set of control variables. Weighted results refer to estimated coefficients from model specifications weighted with the population weights provided by the ELSTAT. In parentheses robust standard errors are reported with clustering at the individual level. Statistical significance: ***at 1%, ** at 5%, * at 10%.

Table A2. The impact of becoming unemployed on health outcomes (no employment entry ahead of the event)

	[1]		[2]		[3]		[4]	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
Women (Individuals: 11,663; Observations: 46,652)								
Self-assessed health (normalized)	-.002 (.006)	-.004 (.009)	.001 (.006)	.005 (.009)	.001 (.007)	.001 (.009)	-.001 (.005)	.001 (.008)
Self-assessed health (good/very good)	.007 (.010)	-.001 (.014)	.006 (.010)	.002 (.014)	.005 (.010)	.002 (.014)	.005 (.010)	.002 (.014)
Self-assessed health (adjusted)	-.006 (.020)	-.012 (.028)	.001 (.020)	.002 (.027)	.001 (.020)	.003 (.028)	-.002 (.017)	-.001 (.025)
Unmet medical care	-.003 (.014)	.015 (.017)	.005 (.014)	.016 (.017)	.005 (.014)	.015 (.017)	.020* (.011)	.028* (.016)
Chronic conditions	-.003 (.010)	.018 (.018)	-.001 (.010)	.018 (.018)	.001 (.011)	.017 (.018)	-.002 (.009)	.014 (.017)
Health limitations	.002 (.010)	.018 (.014)	.007 (.010)	.019 (.014)	.008 (.010)	.018 (.015)	.002 (.009)	.008 (.014)
Men (Individuals: 10,956; Observations: 43,824)								
Self-assessed health (normalized)	-.026*** (.006)	-.024*** (.009)	-.024*** (.006)	-.020** (.009)	-.024*** (.006)	-.020*** (.009)	-.020*** (.006)	-.018** (.008)
Self-assessed health (good/very good)	-.034*** (.010)	-.039** (.015)	-.037*** (.010)	-.038** (.015)	-.037*** (.010)	-.040*** (.015)	-.033*** (.010)	-.037*** (.015)
Self-assessed health (adjusted)	-.080*** (.019)	.071*** (.027)	-.072*** (.019)	-.058** (.027)	-.071*** (.019)	-.057** (.027)	-.060*** (.018)	-.052** (.025)
Unmet medical care	.016 (.013)	.025 (.017)	.026** (.013)	.026 (.017)	.023* (.013)	.020 (.018)	.028*** (.011)	.025 (.017)
Chronic conditions	.014 (.010)	.014 (.014)	.014 (.010)	.016 (.014)	.015 (.010)	.015 (.014)	.011 (.009)	.012 (.013)
Health limitations	.009 (.010)	.002 (.013)	.016 (.011)	.008 (.013)	.011 (.011)	.004 (.013)	.006 (.009)	.001 (.011)
Controls × time trend								
Age dummies	-	-	✓	✓	✓	✓	✓	✓
Additional controls	-	-	-	-	✓	✓	✓	✓
Self-assessed health	-	-	-	-	-	-	✓	✓
Chronic conditions	-	-	-	-	-	-	✓	✓
Health limitations	-	-	-	-	-	-	✓	✓
Unmet medical care	-	-	-	-	-	-	✓	✓

Source: EU-SILC (2003-2020, public use files), Hellenic Statistical Authority (ELSTAT).

Notes: Reported numbers are estimated coefficients of a dummy indicator that takes the value of 1 for the upcoming periods that follow the first unemployment event for each individual and 0 otherwise and are drawn from fixed-effects model specifications. Additional controls refer to gender, native-born, marital status, region of residence, the years of completed schooling, chronic conditions, health limitations, unmet needs for medical care and the baseline year of each wave. All controls refer to variables from the baseline year of each wave interacted with a wave-specific linear time trend. The annual local male unemployment rate and is also included in the set of control variables. Weighted results refer to estimated coefficients from model specifications weighted with the population weights provided by the ELSTAT. In parentheses robust standard errors are reported with clustering at the individual level. Statistical significance: ***at 1%, ** at 5%, * at 10%.

Table A3. The impact of becoming unemployed on health outcomes (no inactivity entry ahead of the event)

	[1]		[2]		[3]		[4]	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
Women (Individuals: 11,663; Observations: 46,652)								
Self-assessed health (normalized)	-.001 (.006)	.002 (.008)	.002 (.006)	.007 (.008)	.001 (.006)	.007 (.008)	.001 (.005)	.005 (.008)
Self-assessed health (good/very good)	.003 (.009)	.004 (.014)	.002 (.009)	.008 (.014)	.001 (.009)	.008 (.014)	.002 (.009)	.007 (.013)
Self-assessed health (adjusted)	-.003 (.017)	.006 (.025)	.006 (.018)	.022 (.025)	.004 (.018)	.023 (.026)	.004 (.015)	.015 (.023)
Unmet medical care	.002 (.012)	.012 (.016)	.010 (.013)	.014 (.017)	.010 (.012)	.012 (.016)	.021** (.010)	.022 (.014)
Chronic conditions	.006 (.009)	.019 (.014)	.008 (.009)	.020 (.014)	.009 (.009)	.018 (.014)	.004 (.008)	.010 (.013)
Health limitations	.003 (.008)	.016 (.011)	.008 (.009)	.018 (.012)	.008 (.009)	.017 (.012)	.003 (.008)	.007 (.011)
Men (Individuals: 10,956; Observations: 43,824)								
Self-assessed health (normalized)	-.021*** (.005)	-.020*** (.007)	-.020*** (.005)	-.016** (.007)	-.019*** (.005)	-.016** (.007)	-.014*** (.005)	-.013** (.006)
Self-assessed health (good/very good)	-.016** (.008)	-.023** (.011)	-.019** (.008)	-.024** (.011)	-.019** (.008)	-.024** (.011)	-.015** (.007)	-.021** (.011)
Self-assessed health (adjusted)	-.065*** (.015)	.060*** (.021)	-.059*** (.015)	-.048** (.021)	-.057*** (.015)	-.047** (.021)	-.044*** (.014)	-.039** (.019)
Unmet medical care	.013 (.010)	.028** (.014)	.023** (.010)	.029** (.014)	.020* (.010)	.023* (.014)	.028*** (.008)	.029** (.013)
Chronic conditions	.006 (.007)	.008 (.010)	.009 (.007)	.010 (.010)	.007 (.007)	.007 (.010)	.001 (.007)	.003 (.009)
Health limitations	-.005 (.008)	-.007 (.010)	.002 (.008)	-.004 (.010)	-.001 (.008)	-.003 (.010)	-.003 (.007)	-.004 (.009)
Controls × time trend								
Age dummies	-	-	√	√	√	√	√	√
Additional controls	-	-	-	-	√	√	√	√
Self-assessed health	-	-	-	-	-	-	√	√
Chronic conditions	-	-	-	-	-	-	√	√
Health limitations	-	-	-	-	-	-	√	√
Unmet medical care	-	-	-	-	-	-	√	√

Source: EU-SILC (2003-2020, public use files), Hellenic Statistical Authority (ELSTAT).

Notes: Reported numbers are estimated coefficients of a dummy indicator that takes the value of 1 for the upcoming periods that follow the first unemployment event for each individual and 0 otherwise and are drawn from fixed-effects model specifications. Additional controls refer to gender, native-born, marital status, region of residence, the years of completed schooling, chronic conditions, health limitations, unmet needs for medical care and the baseline year of each wave. All controls refer to variables from the baseline year of each wave interacted with a wave-specific linear time trend. The annual local male unemployment rate and is also included in the set of control variables. Weighted results refer to estimated coefficients from model specifications weighted with the population weights provided by the ELSTAT. In parentheses robust standard errors are reported with clustering at the individual level. Statistical significance: ***at 1%, ** at 5%, * at 10%.