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IZA DP No. 14700

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ISSN: 2365-9793

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ABSTRACT

Adverse Working Conditions and Immigrants' Physical Health and Depression Outcomes: A Longitudinal Study in Greece

The study examines whether adverse working conditions for immigrants in Greece bear an association with deteriorated physical health and increased levels of depression during 2018 and 2019. Findings indicate that workers with no written contract of employment, receiving hourly wages lower than the national hourly minimum wages, and experiencing insults and/or threats in their present job experience worse physical health and increased levels of depression. The study found that the inexistence of workplace contracts, underpayment, and verbal abuse in the workplace may coexist. An increased risk of underpayment and verbal abuse reveals itself when workers do not have a contract of employment and vice versa. Immigrant workers without a job contract might experience a high degree of workplace precariousness and exclusion from health benefits and insurance. Immigrant workers receiving a wage lower than the corresponding minimum potentially do not secure a living income, resulting in unmet needs and low investments in health. Workplace abuse might correspond with vulnerability related to humiliating treatment. These conditions can negatively impact workers' physical health and foster depression. Policies should promote written employment contracts and ensure a mechanism for workers to register violations of fair practices.

JEL Classification: J81, O15, E24, I14

Keywords: adverse working conditions, physical health, depression, immigrants, refugees, minimum wages, written contracts of employment, threats in job, workplace precariousness

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1. Introduction

The large number of immigrants[1] in European Union (EU) regions represents a challenge for host countries and the immigrants themselves (European Commission, 2020). Immigrants strive to survive, find a job and integrate into the EU as the EU works to address their needs in relation to housing, health, education, and employment to create suitable conditions for their smooth transition (Migration Policy Institute Europe, 2018). Despite the EU's intentions to integrate immigrants, the practices seem to undermine immigrants' lived experiences (Drydakis, 2017).

Immigrants, regardless of their skills, tend to receive manual and low-paid jobs (Migration Policy Institute Europe, 2018; Gemi and Triandafyllidou, 2018; Drydakis, 2017). International studies found that immigrant workers often take on 3-D roles, which refer to dirty, dangerous, and demanding jobs (Ziersch et al., 2021; Moyce and Schenker, 2017; 2018; Bradby et al., 2015). Studies from Australia, the EU, the US and Canada indicate that poor human capital and lack of job protection could weaken immigrants' ability to avoid working in adverse environments associated with vulnerability (Ziersch et al., 2021; Sterud et al., 2018; Premji, 2018; Moyce and Schenker, 2017; Strauss and McGrath, 2017; Campbell and Price, 2016; Anderson, 2010; Sargeant and Tucker, 2009).

Studies on immigrants' workplace experiences, found dimensions of precariousness and forms of precarious work, such as lack of workplace contracts and regulatory protection, a low level of employee control over wages, hours and working conditions, instability, powerlessness to exercise legal rights, threatening treatments, or any combination of these (Strauss and McGrath, 2017; Vives et al., 2013; Kalleberg, 2011; Vosko, 2010). Employers might show a willingness to engage in work unregistered by or hidden from the state for tax or welfare purposes for profitable purposes, and undocumented immigrant workers may undertake such a task because they cannot find a formal job due to their irregular status (Anderson, 2015; Schneider and Williams, 2013; Williams, 2004).

Illegal immigration status, limited knowledge of the language, lack of confidence, poor employment relations knowledge, insecure employment conditions, lack of inspections, inexistence of health insurance and discrimination negatively affect immigrant's integration and well-being (Keidar et al., 2019; World Health Organization, 2018; Drydakis, 2017; Campbell and Price, 2016; Anderson, 2010). Meta-analyses indicate that immigrant workers bear a high burden of physical and

[1] In this study, 'immigrant' represents an umbrella term to refer to people of non-Greek origin who live in Greece who might have, or not have granted a permit to live and work in the state (Oxford Dictionary of English, 2010).

psychiatric morbidity due to employment in a foreign country (Hargreaves et al., 2019; Nielsen and Krasnik, 2010; Ahonen et al., 2007).

The current study aims to examine whether adverse working conditions bear an association with immigrants' physical health and levels of depression. Researchers worked with centers offering free Greek language courses to immigrant population groups to create a longitudinal dataset capturing the period 2018-2019. The dataset focuses on the Attica region, which comprises the entire metropolitan area of Athens and one-third of Greece's population. In the present study, adverse working conditions capture whether workers did not have a written contract of employment, received hourly wages lower than the national minimum, and experienced insults or threats.

In Greece, immigrants comprise a highly vulnerable workforce entrapped in low-paid, and low-quality jobs (Leivaditi et al., 2020; Fouskas, 2018; Drydakis, 2017; 2011a; Drydakis and Vlassis, 2010). Greek studies found that immigrants experience higher unemployment and poverty rates, hiring and wage discrimination, segregation into low-paid occupations, and tend not to receive insurance (Leivaditi et al., 2020; Gemi and Triandafyllidou, 2018; Cavounidis, 2018; Drydakis, 2017; 2012a; 2011b, Drydakis and Vlassis, 2010). The at-risk of poverty rate in 2008 for immigrants stood at 32 percent compared to 19 percent for Greeks, while in 2016, the corresponding rates reached 41 percent and 19 percent (Cavounidis, 2018). The inequalities ascertained between Greek and immigrants with respect to these socio-economic outcomes give rise to serious concerns about the impact of employment conditions on health inequalities (Cavounidis, 2018; Schneider and Williams, 2013).

The current study contributes to the literature. Little empirical research examines the association between adverse working conditions and health-related outcomes in the EU and the US. This situation constitutes a surprise given the increasing number of immigrants in both regions (Eurostat, 2018; Moyce and Schenker, 2017). The research aims to fill such a gap. The majority of studies examine immigrants' social-epidemiology without focusing on working conditions (Hargreaves et al., 2019; World Health Organization, 2018; Moyce and Schenker, 2017). However, employment conditions align with physical and mental health (Ahonen, 2019; Moyce and Schenker, 2017; Drydakis, 2015; Burgard and Lin, 2013; Backé et al., 2012; Lindert et al., 2009; Anderson et al., 2006).

Additionally, most studies on immigrants' physical and mental health have utilized cross-sectional data (Hargreaves et al., 2019). In this study, by collaborating with bodies offering language courses to immigrants, it proved feasible to approach immigrant population groups twice and create a panel dataset. Capturing the dynamics of change in immigrants' responses could enable

a reduction of potential reverse causality (Drydakis, 2015). The literature demonstrated the difficulty of recruiting immigrants for longitudinal study designs (Keusch et al., 2019; Morville et al., 2015; Singh and Clark, 2013). Moreover, in the literature, the majority of studies focused on either physical health or mental health (Hargreaves et al., 2019). This study, by examining both physical health and levels of depression, enables the capture of better-informed patterns. In the present study, by examining how immigrants' labor conditions associated with their physical health and mental health might inform policymakers' plans in relation to workplace inspections, integration policies, and public support services (Hargreaves et al., 2019; World Health Organization, 2018; Simon et al., 2015).

The present study found that working without written contracts of employment, workers receiving hourly wages lower than the national hourly minimum wages, and those experiencing insults and/or threats in their present job experience worse physical health and increased levels of depression. Reflecting on the Health Consequences of Work-related Precarious Experiences theoretical framework (Tompa et al., 2007) it is suggested that immigrant workers without a job contract might not secure a stable living wage and health insurance, prompting deteriorated physical and increased levels of depression. Moreover, reflecting on the Absolute Health Income hypothesis (Grossman, 2000; 1972), it could be ventured that immigrant workers receiving a wage lower than the corresponding minimum wage potentially do not secure a living wage, resulting in unmet needs and low investments in health. In addition, reflecting on the Ecosocial theory (Krieger, 1999) experiences of verbal abuses in the workplace can operate as stressors provoking a psychological and/or physiological stress response (Ahonen, 2019; Moyce and Schenker, 2018). These findings of adverse working conditions and subsequent deteriorated physical health and boosted depressive symptoms indicate the need for immigration, protection and welfare policies to protect immigrant workers.

The rest of the study proceeds as follows. Section 2 offers a literature review and a theoretical framework. Section 3 presents the data gathering, and Section 4 presents the estimation strategy. Section 5 offers descriptive statistics. Section 6 presents the study's estimations. The final section offers a discussion and conclusions.

2. Literature review and theoretical framework

2.a Adverse working conditions and physical and mental health

According to the International Labor Organization (2018), there are 164 million immigrant workers worldwide. Unemployment, poverty, and global conflict have led to a significant increase

in immigrants, and Europe represents a target host region (Migration Policy Institute Europe, 2018). Greece became one of the main entry points for arrivals to Europe due to its geographical location (Migration Policy Institute Europe, 2018).

Socio-economic processes shape health status in the general population, and even more so in immigrant populations (Hargreaves et al., 2019; Simon et al., 2015). The World Health Organization (2018) includes immigration as a social determinant of health. Studies evaluate that immigrants prove more susceptible to musculoskeletal diseases, joint diseases, depression, anxiety, somatic disorders, and disabilities than natives (Bas-Sarmiento et al., 2017; Seabury et al., 2017; Tsao et al., 2015; Kim and Park, 2014; Sole-Auro and Crimmins, 2008). Immigrant workers report pressure to continue working without breaks, experience increased rates of accidents and psychological stress (Hargreaves et al., 2019; Moyce and Schenker, 2018; Bas-Sarmiento et al., 2017; Landsbergis et al., 2014; Marin et al., 2009).

A review study in Spain and Italy found that, compared to natives, immigrant workers showed higher physical demands, poorer environmental working conditions, more exposure to ergonomic and psychosocial hazards, a greater risk of occupational injuries, higher prevalence of low-skilled jobs, higher prevalence of perceived discrimination at work, and worse general and mental health (Arici et al., 2019). A Maltese study found that half of the immigrant respondents indicated that their health or safety is at risk because of their work (Debono and Vassallo, 2019). In addition, a review study in the UK found positive associations between adverse working conditions and deteriorated physical and mental health status including injury, anxiety and depression (Muoka and Lhussier, 2020).

Based on Tompa et al.'s (2007) theoretical framework of the Health Consequences of Work-related Precarious Experiences, inexistence of job contracts, income and benefits inadequacy, inadequate access to health care services, and exposure to physical hazards in the work environment can lead to adverse experiences which in turn can contribute to physical and mental health deterioration. In the empirical literature, it is found that workplace precariousness and inexistence of workplace contracts can negatively affect physical health and mental through material, social, and status deprivation (Kim and Allan, 2020; Ahonen, 2019; Hargreaves et al., 2019; Simon et al., 2015; Sousa et al., 2010; Reid and Schenker, 2016; Vives et al., 2013; Burgard and Lin, 2013; Nielsen and Krasnik, 2010; Ferrie et al., 2008; Marmot et al., 2008; Virtanen et al., 2005). Studies indicate that an inexistence of employment contract is correlated with lack of a guaranteed paycheck, uncertainty, and acceptance of dangerous job tasks without complaint for fear of losing employment (Ahonen, 2019; Moyce and Schenker, 2018; Landsbergis et al., 2014).

Precarious employment bears an association with higher rates of poverty, wage theft and no health or employment benefits (Reid and Schenker, 2016; Hege et al., 2015). No employment

contract means no health insurance, which results in limited access to healthcare services (Simon et al., 2015; National Immigration Law Centre, 2014). Being uninsured is associated with poorer quality of health care, lower rates of preventive care, and greater probability of death (National Immigration Law Centre, 2014). It has been found that uninsured people are more likely than the insured to suffer from undiagnosed chronic conditions (National Immigration Law Centre, 2014). Health insurance is a normal good, implying that vulnerable population groups without a job contract and stable income are less likely to be privately insured (Schneider, 2014; National Immigration Law Centre, 2014).

Reflecting on Tompa et al.'s (2007) framework of the Health Consequences of Work-related Precarious Experiences and empirical patterns (Kim and Allan, 2020; Hargreaves et al., 2019; National Immigration Law Centre, 2014; Vives et al., 2013; Burgard and Lin, 2013) it is suggested that immigrant workers without a job contract might not secure a stable living wage, health benefits and insurance, prompting deteriorated physical and mental health.

Hypothesis 1.a. Inexistence of workplace contracts might be associated with deteriorated physical health.

Hypothesis 1.b. Inexistence of workplace contracts might be associated with deteriorated mental health.

The Absolute Health Income hypothesis (Grossman, 2000; 1972) indicates that low incomes and financial struggles decrease investments in health-enhancing goods/services and can result in physical and mental health deterioration (Grossman, 2000; 1972). Low labor earnings constitute occupational hazards that should act as a target for disease prevention (Leigha et al., 2019; Cole et al., 2002). Low wages and income inequality negatively affect physical and mental health (Pickett and Wilkinson, 2015; Kawachi et al., 2002). However, higher wages could allow workers to afford better goods and services, invest in health, and access health services (World Health Organization, 2018; Kawachi et al., 2002).

National minimum wages are integral elements to overcome low pay, and all firms are obliged to pay the minimum wage per worker profile (Bewley et al., 2014). High-skilled workers do not feel the effects since their market wages breach the minimum wage (Bewley, et al., 2014). However, immigrant workers typically encounter minimum wages, especially in countries where their labor is characterized by poor job quality (Strauss and McGrath, 2017; Campbell and Price, 2016). A meta-analysis found that increases in minimum wages bore an association with increases in physical health (Leigha et al., 2019). Moreover, studies found that higher minimum wages lead to higher birth weights and increased prenatal care (Wehby et al., 2020). Higher minimum wages and introductions of 'living wages' were found to result in lower mortality and improved physical health (Bhatia, 2014; Cole et al., 2002). Studies found that minimum wages could lead to higher job

satisfaction (Lenhart, 2017) and improved mental health (Reeves et al., 2017). In addition, studies evaluate that low wages might negatively affect workers' psychological health and job satisfaction, resulting in stress-induced effects on physical health (Pickett and Wilkinson, 2015; Backé et al., 2012; Faragher et al., 2005).

Consistent with the Absolute Health Income hypothesis (Grossman, 2000; 1972) and empirical results (Leigha et al., 2019; Reeves et al., 2017; Bewley et al., 2014), the present study indicates that a worker receiving a wage lower than the national minimum wage might not secure a living wage, which could induce under-investment in health-enhancing goods/services, prompting deteriorated physical and mental health:

Hypothesis 2.a. A wage lower than the national minimum wage might be associated with deteriorated physical health.

Hypothesis 2.b. A wage lower than the national minimum wage might be associated with deteriorated mental health.

Based on Krieger's (2012; 1999) Ecosocial theory, workplace abuses, psychological stressors, occupational hazards, and socioeconomic deprivation can drive social inequalities in physical and mental health. Abusive working experiences, such as physical abuse and verbal harassment, correlate with workplace stress, fear, humiliation, and poor self-esteem and mental health outcomes for immigrant workers (Hargreaves et al., 2019; Ahonen, 2019; Moyce and Schenker, 2018; Garcia and De Castro, 2016; Figueiredo et al., 2016; Amable et al., 2001). The threat of physical violence and exposure to verbal abuse from employers see immigrant workers acquiesce to longer working hours, unfair assignments, delayed payment, discrimination, and/or working in unsafe conditions (Garcia and De Castro, 2016; Figueiredo et al., 2016). These characteristics could negatively impact physical health and mental health (Simon et al., 2015).

Threats, fear and anger may exacerbate health disparities between groups of workers (Krieger, 2012). Ethnic minorities have been found to face higher post-traumatic stress disorders and psychological-emotional symptoms when exposed to workplace verbal abuses and threats (Okechukwu et al, 2014; Rodríguez-Muñoz, et al. 2010; Rospenda, et al. 2009; Fox and Stallworth 2005). It has been found that experiences of verbal and physical harassment in the workplace can operate as stressors provoking a psychological and/or physiological stress response (Okechukwu et al, 2014; Townsend, et al. 2011; de Castro, et al. 2010; Hansen, et al. 2006; Kivimäki, et al. 2000; Lazarus and Folkman, 1984). Immigrant workers' high stress levels resulting from verbal abuses might influence their health statuses, such as triggering depression, which negatively affects health-promoting and health-seeking behaviors (Maneze et al., 2016; Landsbergis et al., 2014). In addition, physical and verbal abuses could threaten the inner world of immigrants by shattering basic cognitive schema about fairness. This event can negatively impact on immigrants social and

personal identity leading to adverse health outcomes (Okechukwu et al, 2014; Mikkelsen and Einarsen, 2002; Matthiesen and Einarsen 2004).

The present study, reflecting on the Ecosocial theory (Krieger, 1999) and empirical patterns (Okechukwu et al, 2014; Townsend, et al. 2011; Matthiesen and Einarsen 2004) indicates that insults and/or threats in the workplace might negatively affect immigrant workers' physical and mental health through the vulnerability related to abusive treatments:

Hypothesis 3.a. Insults and/or threats in the workplace might be associated with deteriorated physical health.

Hypothesis 3.b. Insults and/or threats in the workplace might be associated with deteriorated mental health.

Figure 1, presents the study's hypotheses (*H1.a-H3.b*). The inexistence of workplace contracts, underpayment, and insults/threats in the workplace might be associated with adverse physical and mental health. It is indicated that the aforementioned adverse working conditions may coexist with each other. A wage rate lower than the minimum, and/or insults and/or threats in the workplace might accompany employment without a contract. The three adverse working conditions require consideration as it seems all have common roots. Firms might decide not to declare economic activity and pay minimum wages to gain an economic advantage (Department for Business, Energy and Industrial Strategy, 2017; Anderson et al., 2006; Williams, 2004). Potentially, the higher the level of adverse working conditions, the physical and mental health deterioration.

It has to be indicated that, early trauma, separation from families, cultural shock and integration stress, difficulty in transferring credentials, language, financial reasons, legal status, lower self-esteem and resilience, stereotyping, and barriers to healthcare services, in addition to adverse working conditi1ons, might deteriorate physical and mental health (Ahonen, 2019; Keidar et al., 2019; Sweileh, 2018; Moyce and Schenker, 2018; Migration Policy Institute Europe, 2018). Furthermore, immigrant workers might face a greater risk of other key social determinants, such as poor housing or living conditions, which can contribute to the risk of other physical health and mental health outcomes (Hargreaves et al., 2019).

2.b The Greek context

The last decade saw Greece experience substantial population mobility (Eurostat, 2018; Cavounidis, 2018; Anagnostou, 2016). Due to the economic recession and increased unemployment, the country lost both Greeks and settled migrants (Eurostat, 2018; Greek Statistics Authority, 2018; Drydakis, 2015). The share of Greek citizens of working age living in another EU member state in 2017 reached 6.0 percent, showing an increase of 1.4 percent from 2007 to 2017 (Eurostat, 2018). The 2011 national census data registered 8.3 percent non-nationals (6.5 percent

non-EU citizens, and 1.8 percent EU citizens) living in Greece. In 2018, according to the Ministry of Migration Policy, the permanent resident population in Greece declined to 5.5 percent (4.8 percent non-EU and 0.7 percent EU citizens, respectively) (Eurostat, 2018). Additionally, since the beginning of 2014, more than a million immigrants arrived in Greece from Turkey (Operational Portal Refugee Situations, 2018). However, the recession forced immigrants to relocate to other EU member states, such as Germany and Sweden (United Nations High Commissioner for Refugees, 2018).

The association between working conditions and immigrants' physical and mental health status received little attention in Greece. Studies on immigrants and ethnic/racial minorities' realities in Greece tend to focus on acculturation (Drydakis, 2013; 2012b), employment (Drydakis, 2017; 2012c; Drydakis and Vlassis, 2010), wage level (Drydakis, 2011b), job satisfaction (Drydakis, 2012d), physical and mental health (Souliotis et al., 2019; Chantzaras et al., 2018; Stathopoulou et al., 2018; Gkiouleka et al., 2018) and digital literacy (Drydakis, 2021). Greece ranks first among the OECD country members in relation to the informal economy, the percentage of uninsured workers, and the percentage of irregular migrants working (Schneider and Williams, 2013). Immigrant workers survive in low-status and low-wage jobs, which expose them to employment-generating activities that do not guarantee health safety (Fouskas, 2018). Immigrants find themselves trapped in exploitative working conditions, which leads them to adopt a self-perception that does not prioritize healthcare and social protection (Fouskas, 2018).

In Greece, financial strain, childhood experiences of economic hardship, as well as experiences of perceived discrimination, appear to have an association with increased level of depressive symptoms for immigrants, while social trust has a protective impact (Gkiouleka et al., 2018; Stathopoulou, 2018; Kotsiou, 2018). Immigrant children, women, and older populations reported higher rates of depression (Stathopoulou, 2018; Kotsiou, 2018; Anagnostopoulos et al., 2017). In addition, immigrants with physical health problems experience higher unemployment rates and lower wages than Greeks with physical health problems (Drydakis, 2010). Increased ability to speak Greek shows a connection with increased knowledge of health services (Galanis et al., 2013). Moreover, increased family incomes correlate with fewer difficulties in accessing health services (Galanis et al., 2013).

A meta-analytical overview of Greek studies on immigrant integration policies in the areas of health, welfare, and social security showed that they face a high risk of social exclusion and unmet health needs due to their poor residence conditions (Balourdos and Tsiganou, 2013). In addition, during the economic crisis in Greece, the welfare provision reductions further increased the risk of social exclusion for immigrants (Anagnostopoulos et al., 2016; Balourdos and Tsiganou,

2013). The economic crisis prompted significant changes in relation to immigrants' unemployment (Gemi and Triandafyllidou, 2018). In 2016, because immigrant employment was heavily concentrated in sectors hit hard by the crisis, the unemployment rate reached 28.1 percent, compared to 22.9 percent for Greeks (Greek Statistics Authority, 2018). In 2018, immigrants' unemployment rate stood at 25 percent and 19 percent for nationals (Greek Statistics Authority, 2018). Even before the onset of the crisis, immigrants proved more likely than Greeks to encounter poverty, and that the gap between the two populations widened further during the crisis (Cavounidis, 2018). Within the EU, Greece was the country most heavily affected by the economic crisis in terms of employment and growth decline (Drydakis, 2015), in addition to receiving a significant number of immigrants (Gemi and Triandafyllidou, 2018). Thus, it proves integral to quantify the level of adverse working conditions for immigrant workers in Greece, and assess the study's hypotheses.

3. Data gathering

Acculturation proves vital for countries and immigrants (Drydakis, 2012b; 2013). Learning the host country's language constitutes a pressing need for immigrants to participate fully in social, economic, educational, and/or professional development (Drydakis, 2012b; 2013). In Greece, immigrants' assimilation and integration strategies positively associate with employment levels and wages (Drydakis, 2012b; 2013). To address adult immigrants' language needs, Greek Ministries, universities, non-governmental organizations, immigrants centers, and other humanitarian centers provide language programs (European Commission, 2016; Brinia and Tsaprazi, 2015; Mattheoudakis, 2005). These courses seek to enable adult immigrants to communicate in speech and writing (Brinia and Tsaprazi, 2015; Mattheoudakis, 2005). Participation is high, and immigrants learn about these programs through their networks (Brinia and Tsaprazi, 2015; Mattheoudakis, 2005).

The research team approached bodies offering language courses to collect longitudinal information. The research team sought to create a list of bodies offering free Greek language courses to adult immigrants and refugees[2] in the Attica region. The team assessed relevant information provided by the websites of the Ministry of Interior, Ministry of Education, Ministry of Labor, and Ministry of Culture, in addition to assessing the websites of universities in Attica. Moreover, analysis of the websites of NGOs dealing with migration and humanitarian issues,

[2] Immigrants who have been forced to leave their country or home, because there was a war or for political, religious, or social reasons (Oxford Dictionary of English, 2010).

humanitarian organizations, and ethnic communities in Attica helped acquire information on language courses. NGOs, humanitarian organizations, and ethnic communities were identified through a Google keyword search using the following terms: ethnic communities; human rights organizations; NGOs on immigration; immigrant and refugee centers; Greek language classes; free of charge; to adult immigrants/refugees; Athens/Attica.

Given the aforementioned processes and criteria, the research identified 30 bodies offering relevant language programs. The process gathered information and contact addresses. In 2018, the identified bodies were approached through emails and by post. The initial correspondence comprised opening letters, participation information sheets, and a sample questionnaire. In the opening letter, the team sought to arrange an initial appointment with the bodies to present the study's aims. The participation information sheet introduced the goals of the survey, namely, collecting information on immigrants' socio-economic characteristics, conditions of employment, and health indicators. The initial meeting aimed to explain the ways the team would plan to distribute the questionnaires during a teaching hour, thereby minimizing any potential risk to the bodies and participants, secure anonymity, and alleviate any concerning issues. It was clearly stated that the research outputs will not contain names, affiliations, photographs, video clips, personal quotes, or case studies. Moreover, the research team sought the acquisition of Consent Forms from directors and participants. Directors and participants received access to details about the university's complaints procedure.

Six bodies expressed an interest in facilitating the project. Formal meetings took place in 2018. The team asked the directors of the bodies for permission to visit the same language class twice and distribute the questionnaires during the 2018-2019 academic year. The aim was to approach each individual twice and create a panel dataset. The team observed that the bodies offered language courses for beginners and those with basic knowledge. For homogeneity, the researchers decided to work with beginners across the six bodies. There existed a heterogeneity in the start date and duration of the program. Two courses were planned to start their delivery in September 2018, with the remainder beginning in October 2018. The duration of the language classes was between 9 and 10 months. The fieldwork took place in November 2018 (first wave) and May 2019 (second wave).

Before the fieldwork could begin, the team asked gatekeepers to provide information on the students' mother tongue languages. These languages would translate the Greek questionnaire,

which was also in English[3]. Participation information sheets and consensus forms also underwent translation. The research team consisted of a principal investigator and two research assistants. With the presence of teachers, the team distributed the survey to the students. A few participants were illiterate. In such cases, literate people supported those in need to complete the surveys.

4. Variables and estimation strategy

4.a Variables

Key demographic characteristics of immigrants were considered after reviewing major socio-epidemiological surveys (Kawachi and Beckman, 2000). These variables constitute critical health and mental health determinants such as age, gender, education, continent of origin, employment status etc. (Kawachi and Beckman, 2000). In the Greek literature, immigrant workers' demographic characteristics, immigration history, and job characteristics constitute health and integration determinants (Drydakis, 2015; Drydakis, 2013; 2012a; 2010). In the present study, in both data gathering periods, participants provided information in relation to their demographic characteristics, years of immigration in Greece, employment, unemployment or inactivity status, and type of job. The study also collected information on refugee status. The Appendix provides the definitions of variables.

The survey obtained labor information in relation to whether workers had a written contract of employment (entitled WoC_{ce}). This measurement enabled the capture of whether the informal economy and/or hidden activity occurred (Schneider and Williams, 2013).

Questions on wages and hours of work formed part of the study. This information enabled the creation of an adverse workplace condition variable capturing whether workers received a net hourly wage (based on the actual hours worked) lower than their corresponding national minimum (entitled WoC_{mw}). This variable aided the determination of whether underpayment occurs (Bewley

[3] The participants were from the following countries: Afghanistan, Albania, Algeria, Armenia, Bulgaria, Congo, Egypt, Ethiopia, Georgia, Ghana, Iran, Iraq, India, Moldova, Nigeria, Pakistan, Philippines, Russia, Syria, and Turkey. The list of languages was: Albanian, Amharic, Arabic, Armenian, Bulgarian, English, Farsi, Filipino, French, Georgian, Hindi, Pashto, Romanian, Russian, Turkish, and Urdu. Immigrant people from ethnic communities, humanitarian bodies and NGOs provided translations from either Greek or English to Albanian, Amharic, Arabic, Farsi, Georgian, Romanian, and Russian. Agencies translated either from Greek or English to Armenian, Bulgarian, Filipino, French, Hindi, Pashto, Turkish, and Urdu.

et al., 2014). For each worker, the researchers compared their earned net hourly wage with the corresponding national minimum net hourly wage level (Bewley et al., 2014).

Furthermore, the survey involved a question to capture whether workers experienced insults and/or threats (entitled WoC_{ins}). The question read: 'In your present job, have you ever experienced insults and/or threats from your employer and/or manager'. This variable aided the determination of whether workplace verbal abuses/threats occur (Okechukwu et al, 2014).

Each adverse working condition thematic (i.e., WoC_{ce}, WoC_{mw}, WoC_{ins}) got a dichotomous outcome (yes/no) capturing whether has ever been experienced.

Physical health was measured through the European Quality of Life Visual Analogue Scale (EQ-VAS), which records individuals' self-rated physical health on a vertical and visual analog scale with endpoints labeled 'Best imaginable health state' and 'Worst imaginable health state' (McDowell, 2006; Priestman and Baum, 1976; Aitken, 1969). The measurement acts as a quantitative measure of summarizing overall physical health that mirrors the individual's perspective (Feng, 2014). The EQ-VAS scale correlates with other general physical health status scales such as the SF-36 dimension on health (Lubetkin et al., 2004). Studies reported high levels of validity and reliability (Feng, 2014; McDowell, 2006). In addition, the EQ-VAS scale has demonstrated construct validity in representative samples of the Greek general population (Kontodimopoulos et al., 2008). Higher scores indicate increasing levels of good physical health (McDowell, 2006).

The Center for Epidemiological Studies Depression Scale was utilized to measure adverse mental health (CESD-20) (Radloff, 1977). CESD-20 is a 20-item self-report depression inventory. The questionnaire included questions such as 'I felt depressed, that everything I did was an effort, I could not get going in the past week'. CESD-20 has good psychometric properties (Björgvinsson et al., 2013; Van Dam and Earleywine, 2011; McDowell, 2006). Each one of the 20 items was answered on a 4-point Likert scale; rarely, some, occasionally, most. Higher CESD-20 scores indicate increasing level of depression (Björgvinsson et al., 2013; McDowell, 2006). In representative Greek samples, the scale has demonstrated validity (Drydakis, 2015).

4.b Estimation strategy

Given the longitudinal nature of the data, identification tests took place to determine which approach better fit the data (Morgan, 2013; Andreß et al., 2013; Menard, 2008). The Breusch-Pagan

LM test took place to determine whether Pooled OLS models might prove more appropriate than Random Effects models (Morgan, 2013; Andreß et al., 2013). Moreover, Hausman tests assessed whether Random Effects models might prove more appropriate than Fixed Effects models (Wooldridge, 2010). Given the identification tests, Random Effects models assessed the determinants of physical health and levels of depression (EQ-VAS and CESD-20) and assessed the study's hypotheses.

For each indicator (EQ-VAS and CESD-20), two models are offered. Model I includes the adverse working conditions (WoC_{ce}, WoC_{mw}, WoC_{ins}). In Model II, explanatory variables are included, such as demographic characteristics, history of immigration, and job type.

In Model I, the zero-order correlations between the main variables of interest are examined (Spector and Brannick, 2011). Model I, allows to test the actual hypotheses and not hypotheses conditional on the explanatory variables (Spector and Brannick, 2011). A negative and statistically significant WoC_{ce} estimate will indicate a negative association between inexistence of written contract of employment and physical health (EQ-VAS). Moreover, a positive and statistically significant WoC_{ce} estimate will indicate a positive association between inexistence of written contract of employment and depression (CESD-20). If the WoC_{ce} estimate remains statistically significant in Model II, which includes critical explanatory variables, then this feature might indicate that the empirical specification does not prove sensitive based on unobserved factors related to fluctuating adverse working conditions. It is indicated that Model II, might reduce potential omitted variable bias (Clarke, 2005).

Given the nature of the phenomenon under consideration, it potentially proves hard to suggest that reverse causality should represent a major concerning factor, namely, from deteriorated physical health and increased levels of depression to sorting into jobs characterized by adverse working conditions. However, given that the present study does not capture vital information, such as post-traumatic stress, pro-immigration socio-economic conditions, personality traits, and coping mechanisms, the patterns should act as associations and not as causal patterns.

5. Descriptive statistics

Table 1 presents employment and inactivity status descriptive statistics. Panel I presents statistics for 2018 and reveals that 61.3 percent of the participants are employed, 32.7 percent are unemployed but actively looking for a job, and the rest are inactive. Panel II shows statistics for 2019 and reveals that the sample contains fewer observations than in Panel I. Thirty individuals did

not continue their classes in the second semester. Consequently, follow-up information is missing. It is presented that more individuals were employed in 2019 than in 2018. The difference proves statistically significant at the 10 percent level ($t=1.84$, $p<0.10$). Panel III pools the data for 2018 and 2019.

[Table 1]

Table 2 offers employed individuals' descriptive statistics. The study aims to evaluate workers' physical health and levels of depression. Panel I presents data for 2018. Panel II offers statistics for 2019. Panel III pools the data and reveals that 75.3 percent are men, the mean age is 32.1 years, and 15.5 percent of the people have a higher or vocational education. The figures also show that 26.3 percent of the workers self-identify as refugees. The majority are from Asia (58.4 percent), followed by Africa (19.8 percent) and Europe (21.7 percent), and they have lived in Greece for approximately 2.9 years.

[Table 2]

Additionally, Panel III indicates that 81.4 percent of the workers receive a net hourly wage lower than the corresponding national minimum. In addition, the figures show that 61.3 percent of the workers do not have a written contract of employment, and 48.7 percent experience insults and/or threats in their job.

Comparing the patterns between 2018 (Panel I) and 2019 (Panel II) reveals statistically insignificant differences for the percentage of workers receiving a net hourly wage lower than the corresponding national minimum ($t=0.03$, $p>0.96$), percentage of workers not having a written contract of employment ($t=0.76$, $p>0.10$), and percentage of workers experiencing insults and/or threats in their present job ($t=1.36$, $p>0.44$).

Additionally, the findings estimate that, in 2019, workers' level of depression (CESD-20) proved statistically significantly lower compared to 2018 ($t=1.82$, $p<0.05$). Statistically insignificant differences are calculated for physical health (EQ-VAS) between the two years ($t=1.37$, $p>0.17$).

Table 3 presents the correlation matrix. Positive correlations exist between not having a written contract of employment (WoC_{ce}), receiving a net hourly wage lower than the corresponding national minimum (WoC_{mw}), and experiencing insults and/or threats in the present job (WoC_{ins}). Physical health (EQ-VAS) bears a negative association with each one of the three adverse working conditions. For instance, physical health is negatively associated with the probability of workers not having a written contract of employment ($r= -0.61$, $p<0.01$) and with the probability of workers

experiencing insults and/or threats in their present job (r= -0.45, p<0.01). In addition, there exists a positive association between depression (CESD-20) and the probability of workers receiving a net hourly wage lower than the corresponding national minimum (r= 0.65, p<0.01).

[Table 3]

6. Regression results

6.a Physical health (EQ-VAS) estimates

Table 4 offers the physical health (EQ-VAS) estimates. In Model I, it is found that workers not having a written contract of employment face a lower physical health status (WoC_{ce}) (coef= -5.418, p<0.01, or -4.9 percent[4]). Workers receiving a net hourly wage lower than the corresponding national minimum net hourly wage (WoC_{mw}) experience a lower physical health status (coef= -6.308, p<0.01, or -7.6 percent). In addition, workers experiencing insults and/or threats in their present job experience a lower physical health (WoC_{ins}) (coef= -4.661, p<0.01, or -3.3 percent). Hypotheses 1.a, 2.a and 3.a are accepted. The highest association involves those workers receiving a net hourly wage lower than the corresponding national minimum net hourly wage (WoC_{mw}).

[Table 4]

Model II offers full informed evaluations. The new findings show that workers not having a written contract of employment (WoC_{ce}) aligns with a lower physical health (coef= -3.816, p<0.01, or -3.4 percent). The same holds for workers receiving a net hourly wage lower than the corresponding national minimum net hourly wage (WoC_{mw}) (coef= -5.889, p<0.01, or -7.3 percent), and for workers experiencing insults and/or threats in their present job (WoC_{ins}) (coef= -4.340, p<0.01, or -3.1 percent). Hypotheses 1.a, 2.a and 3.a are re-accepted.

Moreover, in Model II, it is found that non-refugees perform better in physical health than refugees (coef= 2.703, p<0.01, or 2.9 percent). Men perform better in physical health than women (coef= 3.710, p<0.01, or 4.1 percent). In addition, it is found that, the physical health in 2018 proved worse than in 2019 (coef= -0.734, p<0.05, or -0.5 percent).

[4] A one standard deviation increase in WoC_{ce} is associated with a 4.9 percent deterioration in physical health status (elasticity outcome).

6.b Depression (*CESD-20) estimates*

Table 5 offers the depression (CESD-20) estimates. The table adopts the same estimation strategy as in Table 4. The estimates suggest a positive association between depression and workers not having a written contract of employment (WoC_{ce}) (coef= 4.312, p<0.01, or 18.5 percent), workers receiving a net hourly wage lower than the corresponding national minimum (WoC_{mw}) (coef= 5.005, p<0.01, or 28.5 percent), and workers experiencing insults and/or threats in their present job ($WoC_{ins)}$ (coef= 3.915, p<0.01, or 13.3 percent). Hypotheses 1.b, 2.b and 3.b are accepted. The highest association involves those workers receiving a net hourly wage lower than the corresponding national minimum (WoC_{mw}).

[Table 5]

Model II offers full informed evaluations. The new findings indicate a positive association between depression and workers not having a written contract of employment (WoC_{ce}) (coef= 3.447, p<0.01, or 15.9 percent), workers receiving a net hourly wage lower than the corresponding national minimum wage (WoC_{mw}) (coef= 4.439, p<0.01, or 28.9 percent), and workers experiencing insults and/or threats in their present job ($WoC_{ins)}$ (coef= 3.535, p<0.01, or 12.8 percent). Hypotheses 1.b, 2.b and 3.b are re-accepted.

In Model II, it is found that non-refugees experience a lower level of depression than refugees (coef= -1.565, p<0.01, or -8.1 percent). Men face fewer levels of depression than women (coef= -1.519, p<0.01, or -8 percent). Moreover, estimates suggest that, in 2018, depression proved higher than in 2019 (coef= 1.027, p<0.01, or 3.5 percent).

7. Discussion and conclusions

7.a Discussion

The study examined whether adverse working conditions for immigrants in Greece bear an association with physical health and depression during 2018 and 2019. A panel dataset resulted from the collaboration with centers providing Greek language courses free of charge to immigrant population groups. The study found that working without written contracts of employment, workers receiving hourly wages lower than the national hourly minimum wages, and those experiencing insults and/or threats in their present job experience worse physical health and increased levels of depression. The outcomes found to be held either unconditional or conditional on the study's explanatory variables i.e., age, gender, education (Spector and Brannick, 2011).

The outcomes of this study are in line with the patterns found in international studies (Premji, 2018; Moyce and Schenker, 2017). Australian, US and Canadian studies found that underpayment, nonstandard and unpredictable schedules, economic insecurity, lack of benefits and protections negatively impacted immigrants physical and mental health (Sterud et al., 2018; Premji, 2018; Moyce and Schenker, 2017).

The study indicated that the three adverse working conditions might not exist in isolation. Positive correlations exist among not having a written contract of employment, receiving a net hourly wage lower than the corresponding national minimum wage, and experiencing insults and/or threats in the present job. The outcomes suggested that there is an increase risk of underpayment and verbal abuses when workers do not have a contract of employment, and vice versa. It seems that in the present sample, immigrant workers reported suffering a combination of simultaneous adverse working conditions. The 2019 European Union Agency for Fundamental Rights report on vulnerable immigrant workers in the EU indicated that there are critical interrelated problems with regard to employment contracts, payments, work hours, breaks, safety and human relations (FRA, 2019).

Based on the Health Consequences of Work-related Precarious Experiences framework (Tompa et al., 2007) immigrant workers without a job contract might experience a high degree of economic insecurity and exclusion from health insurance (Hargreaves et al., 2019; Burgard and Lin, 2013; Kim and Allan, 2020). A lack of job contract potentially entails a low level of employee control over wages, benefits, hours, and working conditions (Strauss and McGrath, 2017; Vives et al., 2013). Moreover, based on the Absolute Health Income hypothesis (Grossman, 2000), immigrant workers receiving a wage lower than the corresponding minimum wage potentially do not secure a living wage (Leigha et al., 2019; Bhatia, 2014). Such a condition might bring economic struggles resulting in unmet needs and low investments in health (Pickett and Wilkinson, 2015; Kawachi et al., 2002; Grossman, 2000; 1972). These conditions can negatively impact immigrant workers' physical and mental health (Reid and Schenker, 2016; Vives et al., 2013; Burgard and Lin, 2013). In addition, based on the Ecosocial theory (Krieger, 1999), threats and/or insults align with workplace stress and poor physical and mental health outcomes for immigrant workers (Ahonen, 2019; Moyce and Schenker, 2018; Landsbergis et al., 2014; Amable et al., 2001).

The study found that refugees and women, experienced deteriorated physical health and increased levels of depression than non-refugees and men. International studies evaluated that refugees could experience higher psychiatric morbidity (Heerena et al., 2014; Lindert et al., 2009). Refugees might suffer from post-traumatic stress, which could share a link with deteriorated physical and mental health (Shawyer et al., 2017; Heerena et al., 2014; Lindert et al., 2009).

Additionally, studies found that immigrant women could experience an increased risk of depression on account of their conflicting social roles and low social esteem (Van de Velde, 2010). Immigrant women may be at a double disadvantage of societal bias because they not only have to navigate their roles as immigrants but also face gender inequality, stressors at home related to gendered responsibilities, and an unequal division of home labor (Mousaid, 2016; Simon et al., 2015; Tsai and Thompson, 2013; Vives et al., 2013; Ostrach, 2013).

Moreover, the study found that in 2019, both physical and mental health status proved higher than in 2018. In Greece, those bodies providing language lessons to immigrants also supply services such as legal assistance, support with official documents, housing and employment, health services, and mental health counseling. Immigrants interacting with these bodies actively work towards their integration into the country. Studies found that networks represent an effective way to reach migrants, distribute information, and promote healthy lifestyles (Simon et al., 2015). The longer the period an immigrant learns a language and interacts with a supportive network, the higher the employment options, coping strategies, assimilation and health related outcomes (Drydakis, 2021; 2013; 2012a).

Australian, Canadian, European and US studies related to immigrants' health have found that when immigrants arrive to host countries, they are generally in better health than native residents (Constant et al., 2018; Kennedy et al., 2015). This might be because the healthiest and most motivated people choose to move, while less healthy people stay behind (Constant et al., 2018). It has been found that immigrants' health declines with time spent in host countries and converges toward, or even falls below, the health status of native residents (Constant et al., 2018; Kwak, 2016; Kennedy et al., 2015; De Maio, 2010). The decline in immigrants' health (Healthy-Immigrant-Effect) is attributed to poor working conditions, socioeconomic struggles, and low utilization of healthcare services (Constant et al., 2018; Grove and Zwi, 2006). The Healthy-Immigrant-Effect had not been examined in Greece.

7.b Policy implications

The more integrated immigrants are in a host country, the higher their corresponding net economic contribution to the host economy (Drydakis, 2013). Furthermore, integrated immigrants may prove integral in changing the attitudes of natives toward newcomers (Drydakis, 2012a). If immigrants experience adverse working conditions this pattern might challenge their smooth integration (World Health Organization, 2018; United Nations, 2015). If integration policies prove ineffective, immigrants' health deteriorates (World Health Organization, 2018; Giannoni et al., 2016; Simon et al., 2015). It is found that immigrants reported deteriorated health in exclusionist

countries, resulting in increased health inequalities between immigrants and natives (Puchner et al., 2018; Giannoni et al., 2016; Malmusi, 2015).

Policymakers agreed to decrease disparities within heterogeneous populations by 2030 (United Nations, 2015). There now exists a commitment to improving working conditions, occupational health, and universal health coverage, and access to services (Hargreaves et al., 2019). Based on the Sustainable Development Goals framework, countries should facilitate well-managed and responsible immigration (United Nations, 2015). The ILO calls for policies that promote work opportunities and social protection for immigrants (International Labor Office, 2014). Policies should promote written employment contracts, enhance effectiveness of labor inspections, protect social security benefits, and ensure a mechanism for workers to register violations of fair practices (FRA, 2019; International Labor Office, 2014).

The European Commission's Action Plan on the integration of immigrants considers education and training vital factors in national policies (European Commission, 2016). Policymakers' efforts should aim at turning immigration into a process that, instead of worsening pre-existing challenges, enables the successful integration of immigrants in the host country. Until then, it remains integral that immigrants suffering from physical health and mental health conditions should receive access to sufficient health services (Hargreaves et al., 2019; Liebman et al., 2013; Business for Social Responsibility, 2010).

7.c Limitations and further research

The patterns presented should not represent the general immigrant population in Greece. The study focused only on a specific region: Attica. A new study, covering more regions, could bring more representative outcomes. In this study, in 60 percent of the cases, workers did not have a written contract of employment. Additionally, in 81 percent of the cases, wage levels proved lower than the minimum wage. These patterns potentially indicate a high-level of precarious labor. The assigned patterns stemmed from immigrants' demographic characteristics in the utilized sample, namely, newcomers during a period of a massive economic recession in the host country, with limited knowledge of the language, enrolled in free language programs, with an unknown legal status. Different outcomes will result from a focus on integrated immigrant workers with higher human capital.

The study utilized a sample of immigrants who actively aimed to integrate into Greece by enrolling in language programs. Different outcomes may result if the study had employed marginalized immigrant population groups. Whether the estimated improvements in immigrants' physical health and level of depression in 2019 compared to 2018 were due to integration efforts,

language skills, networking, and better employment conditions requires a thorough longitudinal evaluation. Furthermore, new studies should utilize additional health and mental health inventories and consider specific health conditions.

The present study did not collect information in relation to immigrants granted asylum or seeking such a status. Whether people who belong in this category (i.e., looking for international protection) might experience lower or higher adverse working conditions and deteriorated physical and mental health status requires further consideration. Additionally, the present study could not verify whether those who self-identified as refugees received official recognition from the state as refugees. In the same vein, the study's patterns might be affected by unobserved heterogeneity such as immigrants' early trauma, cultural shock and integration stress, legal status, societal discrimination, and barriers to healthcare services, to name a few. Further studies should capture unexamined explanatory variables and offer better-informed estimates.

In the present study, it proved unfeasible to evaluate whether the level of adverse working conditions had been affected by the economic crisis. Time-series studies examining macroeconomic indicators, such as the level of aggregate unemployment and economic growth, could evaluate associations between financial performance and working conditions. Finally, the inexistence of written contracts of employment and underpayment could represent forms of economic exploitation in the labor market (Heller, 1998; Wright, 1994; 1997; Robinson, 1933; Pigou, 1920). Exploitation commonly describes severe labor market phenomena such as forced labor. In the current study, the dataset did not allow for an assessment of potential labor market exploitations. New studies could adopt ILO's framework of exploitation (FRA, 2019; Eurofound, 2016; ILO, 2012) and offer new insights into the subject matter domain.

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Table 1. Descriptive statistics: Employment, unemployment and inactivity status

	Panel I 2018 year		Panel II 2019 year		Panel III 2018 and 2019 years	
	mean	standard deviation	mean	standard deviation	mean	standard deviation
Employed^ (percent)	61.32	(0.48)	69.26	(0.46)	65.07	(0.47)
Unemployed but actively looking for a job (percent)	32.75	(0.47)	25.19	(0.43)	29.20	(0.45)
Inactive^^ (percent)	5.92	(0.23)	5.54	(0.23)	5.71	(0.23)
Observations	287		257		544	

Notes: (^) Includes self-employed/firm owners and domestic workers. (^^) People not in employment who have not been seeking work within the last year.

Table 2. Descriptive statistics of employed people

	Panel I 2018 year		Panel II 2019 year		Panel III 2018 and 2019 years	
	mean	standard deviation	mean	standard deviation	mean	standard deviation
Men (percent)	77.63	(0.41)	73.07	(0.44)	75.32	(0.43)
Age (c.)	32.07	(7.66)	32.26	(7.83)	32.17	(7.74)
Higher or vocational education (percent)	16.44	(0.37)	14.74	(0.35)	15.58	(0.36)
Non-refugees^ (percent)	73.68	(0.44)	73.71	(0.44)	73.70	(0.44)
Years of immigration in Greece (c.)	2.90	(1.47)	3.03	(1.58)	2.97	(1.53)
Continent of origin: Africa (percent)	21.05	(0.40)	18.58	(0.39)	19.80	(0.38)
Continent of origin: Asia (percent)	57.23	(0.49)	59.61	(0.49)	58.44	(0.49)
Continent of origin: Europe (percent)	21.71	(0.41)	21.79	(0.41)	21.75	(0.42)
Private sector (percent)	100.00	(0)	100.00	(0)	100.00	(0)
Blue-collar workers^^ (percent)	73.02	(0.44)	71.15	(0.45)	72.07	(0.44)
Pink-collar workers^^ (percent)	26.97	(0.44)	28.84	(0.45)	27.92	(0.44)
Workers not having a written contract of employment (WoC_{ce}) (percent)	59.21	(0.49)	63.46	(0.48)	61.36	(0.48)
Workers receiving a net hourly wage lower than the corresponding national minimum net hourly wage (WoC_{mw}) (percent)	81.57	(0.38)	81.41	(0.39)	81.49	(0.38)
Workers experiencing insults and/or threats in their present job (WoC_{ins}) (percent)	52.63	(0.50)	44.87	(0.49)	48.70	(0.50)
Physical health (EQ-VAS) (c.)	66.53	(8.47)	67.80	(7.83)	65.32	(7.75)
Depression (CESD-20) (c.)	14.94	(6.03)	13.70	(5.85)	14.31	(5.96)
Observations	152		156		308	

Notes: The sample excludes self-employed/firm owners and domestic workers. (c.) Continuous variable. (^) The reference category is refugees. (^^) The reference category is white collar workers.

Table 3. Correlation matrix of employed people

	Physical health (EQ-VAS)	Depression (CESD-20)	Workers not having a written contract of employment (WoC_{ce})	Workers receiving a net hourly wage lower than the corresponding national minimum net hourly national wage (WoC_{mw})	Workers experiencing insults and/or threats in their present job (WoC_{ins})
Physical health (EQ-VAS)	1				
Depression (CESD-20)	-0.744 (0.000)*	1			
Workers not having a written contract of employment (WoC_{ce})	-0.616 (0.000)*	0.643 (0.000)*	1		
Workers receiving a net hourly wage lower than the corresponding national minimum net hourly national wage (WoC_{mw})	-0.572 (0.000)*	0.653 (0.000)*	0.549 (0.000)*	1	
Workers experiencing insults and/or threats in their present job (WoC_{ins})	-0.459 (0.000)*	0.601 (0.000)*	0.332 (0.000)*	0.313 (0.000)*	1

Notes: The sample consists of employed people excluding self-employed/firm owners and domestic workers (n=308). P-values are in parentheses. (*) Statistically significant at the 1 per cent level.

Table 4. Physical health (EQ-VAS) estimates

	Model I		Model II	
	beta coefficient from regression	standard error	beta coefficient from regression	standard error
No written contract of employment (WoC_{ce})	-5.418	(0.993)*	-3.816	(1.008)*
Net hourly wage lower than the corresponding national minimum net hourly national wage (WoC_{mw})	-6.308	(1.062)*	-5.889	(1.022)*
Insults and/or threats in present job (WoC_{ins})	-4.661	(0.545)*	-4.340	(0.536)*
Blue-collar workers^	-		-0.230	(0.970)
Non-refugees^^	-		2.703	(0.824)*
Years of immigration in Greece	-		0.447	(0.302)
Continent of origin: Europe^^^	-		1.102	(0.998)
Continent of origin: Africa ^^^	-		-0.571	(1.027)
Age	-		-0.068	(0.052)
Men	-		3.710	(0.963)*
Higher or vocational education	-		-1.938	(1.298)
2018 year[#]	-		-0.734	(0.301)**
Schools	-		Yes	
Observations	308		308	
Wald x^2	249.59		559.94	
Prob>x^2	0.000		0.000	

Notes: The table presents the determinants of physical health. The sample consists of employed people excluding self-employed/firm owners and domestic workers. Random effects estimates. (^) The reference category is pink-collar jobs. (^^) The reference category is refugees. (^^^) The reference category is Asia. ([#]) The reference category is 2019 year. (*) Statistically significant at the 1 per cent level. (**) Statistically significant at the 5 per cent level.

Table 5. Depression (CESD-20) estimates

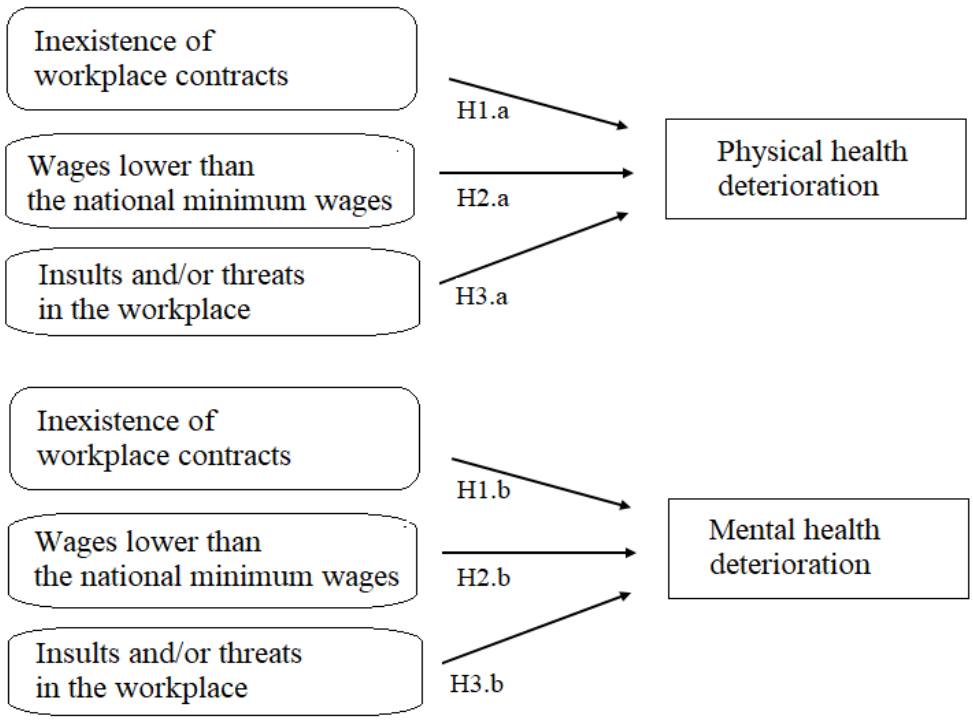
	Model I		Model II	
	beta coefficient from regression	standard error	beta coefficient from regression	standard error
No written contract of employment (WoC_{ce})	4.312	(0.607)*	3.447	(0.629)*
Net hourly wage lower than the corresponding national minimum net hourly national wage (WoC_{mw})	5.005	(0.695)*	4.439	(0.655)*
Insults and/or threats in present job (WoC_{ins})	3.915	(0.391)*	3.535	(0.360)*
Blue-collar workers^	-		0.217	(0.601)
Non-refugees^^	-		-1.565	(0.547)*
Years of immigration in Greece	-		-0.313	(0.195)
Continent of origin: Europe^^^	-		0.990	(0.617)
Continent of origin: Africa ^^^	-		0.338	(0.635)
Age	-		0.009	(0.032)
Men	-		-1.519	(0.596)*
Higher or vocational education	-		-0.361	(0.806)
2018 year[#]	-		1.027	(0.215)*
Schools	-		Yes	
Observations	308		308	
Wald x^2	403.49		559.94	
Prob>x^2	0.000		0.000	

Notes: The table presents the determinants of depression. The sample consists of employed people excluding self-employed/firm owners and domestic workers. Random effects estimates. (^) The reference category is pink-collar jobs. (^^) The reference category is refugees. (^^^) The reference category is Asia. (#) The reference category is 2019 year. (*) Statistically significant at the 1 per cent level.

Appendix. Definitions of variables	
Physical health^	The European Quality of Life Visual Analogue Scale (EQ-VAS)
Depression (or, adverse mental health)^	The Center for Epidemiological Studies-Depression Scale (CESD-20)
Workers not having a written contract of employment (WoC_{ce})^^	1= Yes; 0=No (reference)
Workers receiving a net hourly wage lower than the corresponding national minimum net hourly wage (WoC_{mw})^^	1= Yes; 0=No (reference)
Workers experiencing insults and/or threats in their present job (WoC_{ins})^^	1= Yes; 0=No (reference)
Men^^	1=men; 0=women (reference)
Age^^	Continuous variable measuring individuals' age
Higher or vocational education^^	1= higher or vocational education; 0=in all the other cases (reference)
Non-refugees^^	1=non-refugees; 0=refugees (reference)
Years of immigration in Greece^^	Continuous variable measuring years of immigration in Greece
Continent of origin: Africa^^	1=Africa; 0=Asia (reference)
Continent of origin: Europe^^	1=Europe; 0=Asia (reference)
Private sector^^	1=private sector; 0=public sector (reference)
Blue-collar workers^^	1=blue collar workers; 0=pink collar workers (reference)
Data period^^	1=2018; 0=2019 (reference)
Schools^^	1=School one, two, three, four, five; 0=School six (reference)

Notes: (^) The study's response variables. (^^) The study's predictor variables.

Figure 1. Adverse working conditions and physical and mental health deterioration



Notes: Hypothesis 1.a. indicates that inexistence of workplace contracts might be associated with deteriorated physical health. Hypothesis 1.b. suggests that inexistence of workplace contracts might be associated with deteriorated mental health. Hypotheses 1.a and 1.b are formed based on the Health Consequences of Work-related Precarious Experiences framework (Tompa et al., 2007).
Hypothesis 2.a. presents that a wage lower than the national minimum wage might be associated with deteriorated physical health. Hypothesis 2.b. indicates that a wage lower than the national minimum wage might be associated with deteriorated mental health. Hypotheses 2.a and 2.b are related to the Absolute Health Income hypothesis (Grossman, 1972).
Hypothesis 3.a. suggests that insults and/or threats in the workplace might be associated with deteriorated physical health. Hypothesis 3.b. presents that insults and/or threats in the workplace might be associated with deteriorated mental health. Hypotheses 3.a and 3.b are related to the Ecosocial theory (Krieger, 1999).