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MASTER THESIS

GLOBALIZACIJOS POVEIKIS DEPRESIJOS SUTRIKIMO PAPLITIMUI LIETUVOJE	**GLOBALIZATION EFFECTS WITH DEPRESSIVE DISORDER PREVALENCE IN LITHUANIA**

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SUMMARY

To answer the research question: What is the direction and magnitude of the effects of globalization and relative deprivation on the prevalence of depressive disorders, while looking for potential moderation effects, in the population of Lithuania?

Based on empirical research results, there are moderator interaction effects between health status dimensions and relative deprivation contributing to the prevalence of depression. Relative deprivation ($\delta = 0.001$, $\mathrm{p-value} < 0.001$) and informational globalization ($\gamma_2 = 44.03$, $\mathrm{p-value} < 0.001$) have a statistically significant effect in contributing to depression prevalence. On the contrary, economic ($\gamma_1 = -34.33$, $\mathrm{p-value} < 0.001$), cultural ($\gamma_3 = -100.877$, $\mathrm{p-value} < 0.001$), and political ($\gamma_4 = -98.231$, $\mathrm{p-value} < 0.001$) globalization have a statistically significant effect in reducing depression prevalence.

SANTRAUKA

Atsakant į tyrimo klausimą: Kokia yra globalizacijos ir santykinio nepritekliaus poveikio kryptis ir dydis depresinių sutrikimų paplitimui Lietuvos populiacijoje, įvertinant galimus moderavimo efektus?

Remiantis empirinių tyrimų rezultatais, egzistuoja moderatoriaus sąveikos efektai tarp sveikatos būklės dimensijų ir santykinio nepritekliaus, kurie prisideda prie depresijos paplitimo. Santykinis nepriteklius ($\delta = 0.001$, $\mathrm{p-value} < 0.001$) ir informacinė globalizacija ($\gamma_2 = 44.03$, $\mathrm{p-value} < 0.001$) turi statistiškai reikšmingą poveikį, prisidedantį prie depresijos paplitimo. Atvirkščiai, ekonominė ($\gamma_1 = -34.33$, $\mathrm{p-value} < 0.001$), kultūrinė ($\gamma_3 = -100.877$, $\mathrm{p-value} < 0.001$) ir politinė ($\gamma_4 = -98.231$, $\mathrm{p-value} < 0.001$) globalizacija turi statistiškai reikšmingą poveikį, mažinantį depresijos paplitimą.

INTRODUCTION

Background of the Study: Globalisation has had a significant impact on the prevalence of mental disorders, particularly depressive disorder, which is the focus of this paper's study. The increase in globalisation is the result of an intensification of global economic, political, and social interdependence. Along with the intensification of economic, political, and social interdependence, economic, cultural, political, industrial, urban, and media influences evolve. Between the years of study in this paper, 2014 and 2019, it has been observed that Lithuania has improved wages across all five income groups with the intensification of globalisation. However, there is empirical evidence from other studies that links the increase in the prevalence of depression with the intensification of globalisation. Additionally, income inequality plays a role in contributing to the prevalence of depressive disorder in the community. Therefore, this paper aims to understand the impact of globalisation and income inequality on the prevalence of depressive disorder in Lithuania.

Research Question: What is the direction and magnitude of the effects of globalization and relative deprivation on the prevalence of depressive disorders, while looking for potential moderation effects, in the population of Lithuania?

Hypotheses: Two main hypotheses are formed. H_1: Relative deprivation moderates the association between health status and the probability of depressive disorder. H_2: Globalization and Relative Deprivation has a positive relationship on the prevalence of depression in Lithuania.

Purpose of the Study: To examine the direct and or quadratic direction and magnitude effects between globalization and the prevalence of depressive disorders in Lithuania as observed in studies by Amin (2023), Klijs et al. (2016) and Sebastiån et al. (2018). Additionally, using the Yitzhaki index, this study seeks to assess the direction and magnitude effects of relative deprivation and the prevalence of depressive disorder in Lithuania, following the methods used in the studies by Eibner et al. (2004) and Sebastiån et al. (2018).

Relevance and Niche of The Study: By understanding the direction and magnitude of the effects of globalisation and relative deprivation on the prevalence of depression in Lithuania, policies could be more effectively enacted to improve the mental health of Lithuanians. Additionally, this study identifies further interactions between a respondent's individual health status dimensions and their relative deprivation to provide a clearer understanding of the effects of health and income inequality.

Structure of The Paper: First, a literature review will present the social impacts of depressive disorders, income inequality, globalisation, and relative deprivation. Secondly, the paper will define the dependent, independent, control, and moderator effect variables, hypotheses, and contextual framework of the study. Thirdly, the types of analysis, model specification, variable preparation, and limitations of the empirical research will be explained and discussed. Fourth, the results of the analysis will be presented. Lastly, a discussion of the results will be provided.

1: LITERATURE REVIEW

1.1. Social Impact on Depressive Disorders

Depression is a major public health concern in Lithuania. In the Economist report published by Baxa et al. (2022), depression is connected to homelessness, suicide, and poor health. In an 2024 dataset by Higienos Institutas, (2024), 23.73 percent of individuals are affected by depressive disorder. In the 2017 Eurostat dataset collated by Baxa et al. (2022), Lithuania had the highest suicide rate of all European nations. This was also observed in the report Lithuania: Country Health Profile 2023, (2023), which presented that the suicide rates of both men and women remain the highest among all European nations.

1.1.1. Social Causation Theory

Lund et al. (2010) discuss the social causation hypothesis of depressive disorder, suggesting that people living in environments characterised by poverty, stress, constant negative life events, poor physical and mental health, limited access to healthcare, and persistent stigma towards both physical and mental disorders are more likely to experience and sustain mental illness within their geographical group. Similarly, Mossakowski (2014) reinforces that individuals living in economic hardship are more susceptible to mental illness, and in turn, mental illness constrains their ability to achieve socioeconomic success, further exacerbating the ongoing spiral of socioeconomic deterioration.

In their discussion, Patel & Kleinman (2003) identify key socioeconomic factors influencing depressive disorders, including income, insecurity, hopelessness, social change, education, gender, and comorbidity. Melzer et al. (2004) and Martin-Carrasco et al. (2016) similarly discuss the impact of social causation on the prevalence of depressive disorders, particularly among those with low income. Bhavsar & Bhugra (2008) explore the social effects in workplace settings, specifically how stress in nursing homes, when linked with low income, contributes to depressive disorders. Klijs et al. (2016) note in their study's limitations that the observed sample already suffered from depression or other mental disorders and could not afford

to live in higher income neighbourhoods. As a result, individuals affected by social causation often reside in low income areas, further concentrating the prevalence of depressive disorders. Patel & Kleinman (2003) argue that the identified socioeconomic factors continue to worsen conditions in these geographical areas.

On the other hand, Bhavsar & Bhugra (2008) observe that rising incomes due to increased globalisation may also have a mental health cost. For example, Indian call centre workers earned more than their peers but lost their sense of identity due to the job's demands, including altered sleep patterns. Patel & Kleinman (2003) also noted that in industrialised nations, low income does not always correlate with higher rates of depressive disorders. In some cases, individuals in higher income groups living in unequal environments were at greater risk. One critique of the social causation hypothesis is the difficulty in disentangling social, psychological, and biological factors in the development of depression. As such, the hypothesis has been criticised for potentially oversimplifying depressive disorders (Klijs et al., 2016; Patel & Kleinman, 2003).

1.1.2. Relative Deprivation Theory

The relative deprivation theory, first proposed by Davis (1959), explains the feelings of envy or resentment that arise when individuals perceive or assume that others possess what they are deprived of. Borghesi & Vercelli (2004) explicitly highlight the negative link between globalisation and health through the lens of relative deprivation theory. Lower income groups experience self-exclusion from health-related or sporting events and a loss of self-esteem. These groups are more susceptible to negative emotions when comparing themselves to higher income peers, such as family members, friends, and celebrities. Borghesi & Vercelli (2004) observed that this link contributed to depressive disorders among low income earners. Similarly, Klijs et al. (2016) discuss how low income earners are more likely to engage in pessimistic self-reflection when living near high income earners, leading to long term psychosocial stress and depressive disorders. Klijs et al. (2016) also note that the collective resources model, which

operates under similar conditions, could benefit low income earners by providing access to social goods and services within wealthier neighbourhoods

Studies such as Bhugra & Mastrogianni (2004) and Naz (2023) have used cross-sectional surveys and longitudinal analyses to examine the association between individuals' perceived relative standing and their mental health outcomes. Qualitative research, including in-depth interviews and focus groups conducted by Amin (2023) and Bhavsar & Bhugra (2008), has also offered valuable insights into the subjective experiences and mechanisms underlying the relationship between relative deprivation and depression. Empirical evidence shows that individuals who perceive themselves as relatively deprived compared to their peers are more likely to report higher levels of depressive symptoms, even after controlling for socioeconomic status (Bhugra and Mastrogianni, 2004; Naz, 2023). These findings support the idea that relative deprivation plays a role in the prevalence of depressive disorders.

Bhugra & Mastrogianni (2004) explain that the detrimental effects of relative deprivation on mental health are more pronounced among low income and socially disadvantaged groups because they are more acutely aware of their relative standing and are therefore more vulnerable to psychological consequences. Furthermore, the impact of relative deprivation on depression may be heightened in more unequal societies, where the gap between those who "have" and those who "have not" is more conspicuous (Amin, 2023; Guerra & Eboreime, 2021).

However, while existing studies demonstrate a correlation between perceived relative deprivation and the prevalence of depressive disorders, the direction and magnitude of this relationship and the potential for reverse causality remain debated Bhugra & Mastrogianni, (2004). Additionally, measuring and justifying the concept of relative deprivation across different studies presents challenges. Studies such as Huang et al. (2019) have used various indicators, including subjective assessments of relative standing, income inequality measures, and comparisons to other reference groups.

1.2. Income Effects

The concept of the income effect is a complex area of socio-economic research that encompasses various dimensions of how income influences individual behaviour, well-being, and broader social outcomes. In the text by Kawachi & Subramanian (2014), income effects are classified into three primary categories: absolute, contextual, and relative. Each of these categories provides a different understanding and classification of the relationship between income inequality and life outcomes, particularly health, mental health, and consumption patterns.

1.2.1. Absolute Income Effects

The absolute income effect suggests that an individual's wellbeing is directly linked to their own income level. This relationship suggests that as income increases, an individual's capacity to invest in health, education, and other resources that enhance quality of life increases likewise. According to the text by Kawachi & Subramanian (2014), the main assumptions for the absolute income effect are that there is a causal relationship between income and health, the relationship between income and health is concave, and income redistribution from the rich to the poor through taxation must be implemented.

In studies conducted by Gravelle & Sutton (2009) and Sebastiån et al. (2018), it was observed that higher individual income correlates with improved health outcomes and lower rates of mental health issues. Sebastiån et al. (2018) found strong support for the absolute income effect in relation to psychological distress, demonstrating a gradient in poor mental health across low to high income quintiles, with lower income associated with higher mental distress levels, and higher income associated with better mental health. The study by Gravelle (1998) reinforces the theory that individual health is significantly influenced by absolute income levels, particularly in high income countries, indicating that increasing personal income directly improves health outcomes and thereby highlights the importance of the absolute income theory in a nation's health policy.

1.2.2. Contextual Income Effects

The contextual income effect emphasises the impact of income inequality and distribution within a given community, proposing that the broader economic, social, and built environment can shape individual outcomes regardless of one's personal income Wolfson et al. (1999). This theory is often framed within the context of relative deprivation, where individuals' perceptions of their economic standing relative to others can influence their mental wellbeing and social cohesion.

The study by Cheung & Lucas (2016) highlights the contextual effect of income inequality. It was observed from the study that higher income inequality within communities intensified people's perception of deprivation and adversely affected their individual subjective wellbeing. Their findings indicate that individuals are more affected by the relative income of their peers than by their absolute income, demonstrating the contextual effect between an individual and societal income levels.

However, there are studies evaluating the contextual income effect that produced mixed results. For example, in the study by Sebastiån et al. (2018), there was no observed significant support for contextual income effects when measuring income inequality at the municipal level in relation to health outcomes. This observed difference in results between the two studies highlights the complexity of the contextual effect in incomes influencing health and wellbeing, suggesting that the degree of contextual income effect may vary across different settings and populations.

1.2.3. Relative Income Effects

According to the text by Kawachi & Subramanian (2014), the relative income effect focuses on how individuals assess their wellbeing based on their income relative to others, emphasising the significance of social comparisons. This theory suggests that individuals derive satisfaction not merely from their own income, but also from how their income compares to those around them. The implications of this effect are particularly noticeable in discussions around social capital and community cohesion. Kawachi & Subramanian (2014) also noted that

this effect has brought about two types of malicious psychological effects, namely positional competition and violations of norms of fairness. Both types of effects are suggested to affect a person's health through stress and frustration.

In a study conducted by Cheung & Lucas (2016), there was compelling evidence for the relative income effect, illustrating how individuals' confidence in institutions diminishes when they perceive themselves to be economically disadvantaged relative to their peers. Their study indicates that higher levels of income inequality in a community can undermine social capital and trust in institutions, ultimately impacting overall societal wellbeing.

Similarly, the study by Oshio et al. (2011) demonstrates that the relative income effect significantly influences happiness across different cultures, including China, Japan, and South Korea. It was observed that individual satisfaction is closely tied to one's relative income position compared to peers. Their findings suggest that the relative income effect theory could be applicable universally, asserting that individuals consistently evaluate their happiness based on social comparisons.

In the literatures and text conducted by Adjaye-Gbewonyo & Kawachi (2012), Cheung & Lucas (2016), Kawachi & Subramanian (2014), and Oshio et al. (2011), the relative income effects were measured using the Yitzhaki index approach.

1.3. Globalization Effects on Depressive Disorder

1.3.1. Political Globalization

The relationship between political globalisation and depressive disorder refers to the increased integration and interconnectedness of political systems, institutions, and decision-making processes across national borders (Amin, 2023; Bhugra & Mastrogianni, 2004), much like the European Union. While cross-border political integration may make economic sense and provide opportunities, it comes with significant implications for population mental health. Social, economic, and cultural factors that accompany governmental policies influence the prevalence of depressive disorders. The acculturative stress model explains that the rapid

cultural changes and social turmoil associated with political globalisation can lead to increased psychological distress and the development of mental health problems, including depressive disorders (Amin, 2023; Bhugra & Mastrogianni, 2004; Iwamasa et al., 2019).

To investigate the relationship between political globalisation and the prevalence of depressive disorders across countries, Amin (2023) and Bhugra & Mastrogianni (2004) conducted qualitative studies to analyse the life experiences of individuals with depressive disorders resulting from political globalisation and economic changes. It has been observed that there is a positive association between political globalisation and increased rates of depressive disorder, particularly in low and middle income countries (Bhavsar & Bhugra, 2008; Milner et al., 2011). These findings suggest that the destabilising effects of political and economic integration, such as social disruption, increased inequality, and reduced access to mental health services, can contribute to the development of depressive symptoms. A similar phenomenon was also observed by Tabash et al. (2024), where a curvilinear correlation, known as the Kuznets curve, was identified between income inequality and economic growth.

While some research has observed negative mental health consequences due to political globalisation, the relationship between political globalisation and depressive disorder is complex and often requires context-dependent analysis. Existing research on political globalisation and its effect on depressive disorders remains niche and complicated. An example of this complexity is the challenge of separating the specific effects of political globalisation from those of economic or social globalisation, which may also have independent or interactive effects on mental health (Amin, 2023; Bhugra & Mastrogianni, 2004). Therefore, continued research is needed to further clarify the specific mechanisms through which political globalisation influences population mental health.

1.3.2. Informational Globalization

The increased interconnectedness and exchange of information across global economies, societies, and cultures have had significant implications for mental health (Alam et al., 2020;

Bhugra & Mastrogianni, 2004). One aspect of globalisation that has garnered particular attention is informational globalisation, where the flow of information, ideas, and cultural influences across borders has been facilitated by advancements in communication technologies (Bhavsar & Bhugra, 2008; Melluish, 2014).

The theory of social integration posits that as societies modernise and become more globalised, the disruption of traditional social support structures can foster feelings of isolation, alienation, or hysteria, thereby increasing the risk of depressive disorders (Bhavsar & Bhugra, 2008; Bhugra, 2016). Bhavsar and Bhugra (2008) also explain that Western-led psychological discoveries, which are primarily based on studies in Western-leaning nations, raise the question of whether non-Western nations would benefit from these treatments, or whether they risk worsening the status quo.

Cross-country comparative studies, such as those by (Amin, 2023) and Lin et al. (2020), have used panel data analysis to investigate the impact of globalisation indicators, such as internet penetration and media exposure, on the prevalence of depression across different nations. These studies also reflect the concern raised in the previous paragraph, that research conducted in Western-leaning nations may not reflect the same observations if conducted in non-Western contexts. Other studies have taken a qualitative approach, using in-depth interviews to explore how changing cultural norms and identities, shaped by informational globalisation, influence the experience and expression of depression in specific contexts (Bhavsar & Bhugra, 2008).

As with research on political globalisation, the empirical evidence on the effects of informational globalisation on depressive disorders remains niche and complex. A study by Amin (2023) found an inverted U-shaped relationship, where moderate levels of informational globalisation are associated with lower rates of depression, but higher levels lead to an increase in depressive disorders. Similar to observations on political globalisation, the impact of

informational globalisation also depends on the stage of the globalisation process (Tabash et al., 2024).

However, several limitations arise from studies by Bhavsar and Bhugra (2008), Amin (2023), Lin et al. (2020), and Tabash et al. (2024) regarding the conclusions that can be drawn from their findings. First, the measurement of informational globalisation itself remains ambiguous or unspecified. For example, quantitative measures of internet usage or media exposure may not fully capture the complexity of this phenomenon. Milner et al. (2011) highlight the difficulty in measuring these variables, noting that what represents the processes of globalisation in one culture may reflect its outcomes in another. Furthermore, most research has focused on cross-country comparisons, overlooking the importance of local context in shaping the mental health impacts of informational globalisation (Bhavsar and Bhugra, 2008; Milner et al., 2011; Tabash et al., 2024).

1.3.3. Cultural Globalization

The key aspect of cultural globalisation is the unlimited access to information and media through the internet, as described in the above paragraph on informational globalisation (Amin, 2023; Bhavsar & Bhugra, 2008). The cultural identity theory suggests that the rapid exposure to new cultural influences can lead to a sense of cultural dissonance and identity confusion, which can increase the risk of developing depressive disorders (Bhavsar & Bhugra, 2008; Melluish, 2014). Additionally, the social defeat hypothesis posits that the experience of cultural marginalisation and perceived social disadvantage associated with globalisation can activate biological stress pathways, contributing to the development of depressive disorder symptoms (Truong, 2021).

Qualitative studies conducted by Amin (2023) and Bhavsar and Bhugra (2008) include in depth interviews and ethnographical observations of the study's sample cultures, customs, and habits to explore the lived experiences of individuals navigating cultural changes. Quantitative studies conducted by Bhugra and Mastrogianni (2004), Melluish (2014), and Truong (2021)

have examined the association between proxy measures of cultural globalisation, such as cultural distance or assimilation, and the prevalence of depressive disorders across countries and communities.

Again, unsurprisingly, the observation from empirical evidence presents a mixed picture. Studies conducted by Amin (2023) and Bhavsar and Bhugra (2008) observed that increased exposure to global cultural influences can lead to higher rates of depressive disorders, particularly among individuals and communities experiencing significant cultural disruption. This aligns with the study conducted by Truong (2021) on cultural identity and social defeat theories, suggesting that the challenges of adapting to new cultural norms through migration, combined with the perceived experience of marginalisation, can contribute to the development of depressive disorders.

As expected, and with reference to the discussion in the above paragraphs, these studies have observed a U shaped or inverted U shaped pattern, where moderate levels of cultural globalisation are associated with lower rates of depression, but both low and high levels are linked to increased prevalence (Bhugra and Mastrogianni, 2004; Melluish, 2014; Tabash et al., 2024). This suggests that the relationship between cultural globalisation and depressive disorder prevalence may reflect an initial beneficial effect of cultural exchange and adaptation, followed by detrimental effects as the cognitive and social challenges become overwhelming.

1.3.4. Economic Globalization

Similarly, the relationship between economic globalisation and depressive disorders suggests that the rapid sociocultural and economic changes brought about by globalisation can have significant mental health implications, such as depressive disorders. Economic globalisation involves various processes such as increased international trade, foreign direct investment, and labour migration. Economic globalisation spreads cultures and ideologies across borders due to trade, economic, and human capital movement globally. Despite the economic gains this phenomenon has given rise to, rapid and sustained economic globalisation has been

observed to lead to disruptions in traditional social structures, identity crises, and heightened social and economic pressures, which in turn may contribute to the prevalence of depressive disorders (Amin, 2023).

Quantitative studies by Amin (2023) and Naz (2023) used panel data analysis techniques to examine the relationship between economic globalisation and depressive disorders across multiple countries and over time. Separately, Bhavsar and Bhugra (2008) have focused on qualitative investigations to explore the mechanisms by which globalisation affects the prevalence of depressive disorders.

Again, the empirical evidence on the relationship between economic globalisation and depressive disorders presents a complex and nuanced picture, where the Kuznets curve relationship between economic globalisation and depressive disorder is observed, indicating that the effects of globalisation on depression may initially be positive or negative depending on the level of globalisation (Bhugra and Mastrogianni, 2004; Melluish, 2014; Tabash et al., 2024). In high income countries, the data suggest an inverted U-shaped relationship associated with lower rates of depression. The converse is also true, where middle- and low-income countries tend to exhibit a U shaped relationship, where depression rates are observed to decrease initially as globalisation increases but rise again at higher levels of globalisation. This implies that high income countries experience relatively moderate levels of globalisation compared to their current environmental lifestyle, while middle- and low-income countries with initially very low levels of economic globalisation currently experiencing relatively very high levels of globalisation exhibit higher prevalence of depressive disorders.

As discussed earlier, the complexity of the globalisation process and the cointegrated factors between each globalisation dimension make it challenging to isolate the specific effects of globalisation on the prevalence of depressive disorders (Amin, 2023). As existing studies such as Milner et al. (2011) and Tabash et al. (2024) have pointed out, there is difficulty in establishing a clear relationship between economic globalisation and depressive disorders,

making the justification for the measurement of globalisation itself subject to debate, with different variables to consider and approaches that will yield varying results. There is also a lack of context specific or country specific analysis that considers the complex nature of globalisation's impacts across different populations, cultures, and socioeconomic divisions (Bhavsar and Bhugra, 2008).

1.3. Conclusion

Existing literature presents observations of the apparent direct effects of economic, cultural, informational, and political globalisation on depressive disorders. In addition to globalisation factors, there are direct effects of relative deprivation on depressive disorders.

In studies conducted by Amin (2023), Bhugra and Mastrogianni (2004), Melluish (2014), and Truong (2021), a key critique is the difficulty in justifying the measurements of globalisation, since there are different variables to consider within each specific cultural context and various approaches that yield differing results. Therefore, in the following analysis and discussion of this paper, the globalisation indexes will be clearly differentiated to avoid overlapping observations. The cultural context will not present an issue in the analysis, as the demographic focus is on the population of Lithuania.

In texts by Sebastiån et al. (2018), a curvilinear relationship, known as the Kuznets curve, is observed during periods of both low-income inequality and high-income inequality. Among the three income effect theories listed above, absolute, contextual, and relative, the relative income effect theory is considered the most suitable for the Lithuanian context. According to statistics published by the OECD in 2021, Lithuania had the highest GINI index in the European Union. The absolute income theory is more appropriate for systems where wealth is evenly distributed among income groups. Even though the contextual income effect may be relevant in the Lithuanian context, Kawachi and Subramanian (2014) and Sebastiån et al. (2018) note that there have been contradictory results depending on other factors, such as the geographical area and health outcomes of the population group. The relative income effect

theory accounts for the stress and frustration described by Sebastiån et al. (2018) that is experienced by lower income groups and that eventually leads to poorer health outcomes. Therefore, the application of the relative income effect theory in this study is deemed most appropriate.

Both the social causation and relative deprivation theory provide the framework in understanding the role of social factors and income inequality in the prevalence and distribution of depressive disorders. Methodological approaches conducted by Adjaye-Gbewonyo and Kawachi (2012), Sebastiån et al. (2018), and Yitzhaki and Lerman (1991) have successfully analysed the relative deprivation of communities using income inequality or GINI data. In the study conducted by Sebastiån et al. (2018) in Northern Sweden, covariates such as gender, age, education, marital status, immigration status, and occupation were also considered in the population definition and the subsequent calculation of relative deprivation.

2: DEVELOPMENT OF THE CONCEPTUAL FRAMEWORK

2.1. Introduction

To summarise the literature review discussed above, the prevalence of depressive disorder in the community is influenced by social, economic and globalization factors. The development of the contextual framework aims to assess the effects of globalization on the prevalence of depressive disorder in Lithuania, where depressive disorder is the dependent variable.

2.2. Defining Independent, Dependent, Mediator Variables

2.2.1. Depression

According to Kroenke et al. (2009) the Patient Health Questionnaire (PHQ 8) depression scale is a suitable tool for evaluating depression in a population-based study. In accordance with the Diagnostic and Statistical Manual of Mental Disorders IV (DSM IV), a PHQ 8 score of 10 or above is sufficient to classify a respondent as having a depressive disorder. The response of the

respondent was collected in the survey under “mh1a” to “mh1h”. Additionally, an additional survey questionnaire was posed to the respondents if they have had been diagnosed with depression in the past 12 months. The response of the respondent was collected under “cd1o”.

Using the response collected from the PHQ 8 survey and cd1o question, “depression” could be coded as a binary dependent variable. The following tables documents the missing data imputations, reliability scores of the PHQ 8 survey, and then the calculation of the score of the PHQ 8 survey questionnaire.

Table 1

Proxy Data Imputations for MH (PHQ8) Survey

Dataset Year	Variable Name	Response	n
2019	mh1a	-3	78
2019	mh1b	-3	78

Table 2

Missing Data Imputations for MH (PHQ8) Survey

Dataset Year	Variable Name	Response	n
2014	mh1a	-1	30
2014	mh1b	-1	21
2014	mh1c	-1	8
2014	mh1d	-1	12
2014	mh1e	-1	20
2014	mh1f	-1	65
2014	mh1g	-1	50
2014	mh1h	-1	167
2019	mh1a	-1	56
2019	mh1b	-1	52
2019	mh1c	-1	41
2019	mh1d	-1	37
2019	mh1e	-1	42
2019	mh1f	-1	133
2019	mh1g	-1	47
2019	mh1h	-1	94

Table 3

Data Reliability for MH (PHQ8) Survey

Dataset Year	Variables	Original Cronbach α	Result Cronbach α
2014	mh1a – mh1h	0.854	0.866
2019	mh1a – mh1h	0.887	0.891

The PHQ8 survey questionnaire score is calculated using the formula:

$$\text{PHQ8} = \sum_{\text{h}}^{\text{a}} \text{mh1} \qquad \{1\}$$

2.2.2. Relative Deprivation

From the discussion in the literature review, Borghesi & Vercelli (2004) and Klijs et al., (2016) explains health through the lens of relative deprivation theory where lower-income groups experience self-exclusion from health-related or sporting events, are more likely to engage in pessimistic self-reflection when living near high-income earners, contributing to the loss of self-esteem amongst themselves. When comparing themselves to higher-income peers, such as family members, friends, and celebrities, relative deprivation contributed to long-term psychosocial stress and depressive disorders among low-income earners. Studies conducted by (Bhugra & Mastrogianni, 2004; Naz, 2023) shown that individuals who perceive themselves as relatively deprived compared to their peers are more likely to report higher levels of depressive symptoms, even after controlling for socioeconomic status.

The measure of the Relative Deprivation index is calculated with the formula:

$$\text{RD}_\text{i} = \sum_{j=i+1}^{5} \left(\frac{n_j}{N}\right)(y_j - y_i) \qquad \{2\}$$

where:

y_i is the mean income of quintile.

n_j is the number of people in a higher quintile.

N is the total population. 5205 in 2014; 4599 in 2019.

Table 4

Missing Data Imputations for hhincome survey

Dataset Year	Response	Imputed
2019	-1	593

Missing data had been imputed using the Expectation-Maximization (EM) Method in SPSS. According to Moon (1996), the EM Method is suitable since it best estimates the parameters by maximizing the complete data log likelihood, retaining the data's characteristics.

2.2.2.1. Moderator Effects with Relative Deprivation

Moderation analysis tests the association between health status and depressive symptoms according to individuals' level of relative deprivation. Relative deprivation serves as a moderating variable that either increases or reduces the effect of the health status variable on depression outcome.

This is modelled by including an interaction term between health status and relative deprivation:

$$\mathrm{M}_{m,i} = \mathrm{hsScore}_{m,i} \times \mathrm{RD_i} \quad \{3\}$$

where:

$\mathrm{M}_{m,i}$ is the product of the interaction term between health status score and relative deprivation,

$m \in \mathrm{HS\_Score}_i, \mathrm{CD\_Score}_i, \mathrm{AC\_Score}_i, \mathrm{PL\_Score}_i, \mathrm{PC\_Score}_i, \mathrm{HA\_Score}_i, \mathrm{PN\_Score}_i.$

This produces seven moderator variables:

1. $\mathrm{HS\_Score}_i \times \mathrm{RD}_i = \mathrm{HS\_RD\_Moderator}_i$ {4.1}
2. $\mathrm{CD\_Score}_i \times \mathrm{RD}_i = \mathrm{CD\_RD\_Moderator}_i$ {4.2}
3. $\mathrm{AC\_Score}_i \times \mathrm{RD}_i = \mathrm{AC\_RD\_Moderator}_i$ {4.3}
4. $\mathrm{PL\_Score}_i \times \mathrm{RD}_i = \mathrm{PL\_RD\_Moderator}_i$ {4.4}
5. $\mathrm{PC\_Score}_i \times \mathrm{RD}_i = \mathrm{PC\_RD\_Moderator}_i$ {4.5}
6. $\mathrm{HA\_Score}_i \times \mathrm{RD}_i = \mathrm{HA\_RD\_Moderator}_i$ {4.6}
7. $\mathrm{PN\_Score}_i \times \mathrm{RD}_i = \mathrm{PN\_RD\_Moderator}_i$ {4.7}

A significant interaction indicates an interaction between health status and relative deprivation on the outcome of depression disorder. Identifying moderation between health status variables and relative deprivation would be useful in identifying at-risk individuals with poor health status who also experience high relative deprivation (Zhao & Peng, 2021).

2.2.3. Economic Globalization

Data retrieved from the KOF Swiss Economic Institute (Gygli et al., 2019). Economic globalization index is a measure of an average of two subcomponents: Prevalence of non-tariff trade barriers and compliance costs of importing and exporting, income from taxes on international trade as percentage of revenue (inverted), unweighted mean of tariff rates, prevalence of foreign ownership and regulations to international capital flows, Chinn-Ito index of financial openness, and Jahan-Wang index of openness of the capital account.

2.2.4. Informational Globalization

Data retrieved from the KOF Swiss Economic Institute (Gygli et al., 2019). Informational globalization index is a measure of share of households with a television set, internet access among individuals as a percentage of the Lithuanian population, and press freedom of the legal environment for the media, political pressure that influence reporting and economic factor that affect access to news and information.

2.2.5. Cultural Globalization

Data retrieved from the KOF Swiss Economic Institute (Gygli et al., 2019). Cultural globalization index is a measure of ratio of girls to boys enrolled in primary education level in public and private schools, human capital index based on the average years of schooling and an assumed rate of return to education, and civil liberties on aspects on freedom of expression and belief, associational and organizational rights, rule of law and personal autonomy and individual rights.

2.2.6. Political Globalization

Data retrieved from the KOF Swiss Economic Institute (Gygli et al. (2019). Political globalization index is a measure of number of international inter-governmental organisations in which Lithuanian is a member of, international treaties signed between Lithuania and other states ratified by the highest legislative body of each country since 1945, and number of distinct treaty partners of a country with Bilateral Investment Treaties (BITs).

2.3. Defining Control Variables

2.3.1. County

According to the statistics provided by the (Lithuanian official statistics producers, 2022), the GDP per-capita in the three counties, Vilnius, Kaunas, and Klaipėda, were above average in 2020 of 17.8-thousand Euros. The remaining seven counties, Šiauliai, Panevėžys, Telšiai, Marijampolė, Alytus, Utena, and Tauragė were below the average. Two binary variables were created to reflect the economic activity of the two groups, MajorCity and MinorCity.

2.3.2. Degree of Urbanization

The variable "LivingUrbanDegree" is a score of urbanization of the respondent's place of residence. The formula to calculate the degree of urbanization is:

$$\text{LivingUrbanDegree} = x \times \text{density} = \begin{cases} x \times \text{density}, & \text{if x} = 1 \\ (\text{x} \times \text{density}) + 3, & \text{if x} = 2 \end{cases} \quad \{5\}$$

where:

x is the place of residence being in a rural or city area. Rural area is given a score of 1, city area is given a score of 2.

density: the density of population in the area. Ranging from a score of 1 to 3 to reflect sparse, medium, and dense population in the area respectively.

2.3.3. Education Levels

Three binary variables were created to reflect the economic activity of the distinct educational levels. "PrimaryEduc" refers to education levels from ISCED0 to ISCED2. "SecondaryEduc" refers to education levels from ISCED3 to ISCED4. "TertiaryEduc" refers to education levels from ISCED6 to ISCED8. The educational level, ISCED5, has been omitted in the survey questionnaire.

2.3.4. Employment Status

Five employment statuses have been grouped in the dataset. Five binary variables were created to reflect the employment status of the respondent, "FullTimeSelfEmployed", "PartTimeSelfEmployed", "FullTimeEmployee", "PartTimeEmployee", and "Unemployed".

2.3.5. Equivalent Household Size

The variable "HHEqualizedSize" is a score of the household size. A score of equivalent household size is chosen to reflect the calculation of the net monthly equalised income of the household. The formula is to calculate the net monthly equalised income of the household is:

$$\text{Net monthly equivalised income of the household} = \frac{\text{Total net monthly income of the household}}{\text{Equivalent household size}} \quad \{6\}$$

where,

$$\text{Equivalent household size} = 1 + 0.5x_{14\leq} + 0.3x_{14>}$$

$x_{14<}$: refers to the subsequent person aged 14 and over

$x_{14>}$: refers to the subsequent person aged under 14.

2.3.6. Health Status Variables

The calculated scores range from zero to one, higher means a worse health for the respondent. The range is as such to correspond to the binary-coded dependent variable where "1" denotes the presence of depressive disorder with the respondent. This sub-chapter will also document the data transformation of the recorded responses to ease calculation through Excel if applicable, missing data imputations, reliability scores of the individual survey if applicable, and then the calculation of the score of the health status variable.

2.3.6.1. Health Status

Health Status (HS) is a subjective questionnaire measuring the respondent's self-perceived physical, social, psychological, and biomedical health.

Table 5

Proxy Data Imputation for Health Status Survey

Dataset Year	Variable Name	Response	n
2019	hs1	-3	78

Table 6

Missing Data Imputation for Health Status Survey

Dataset Year	Variable Name	Response	n
2014	hs1	-1	593
2019	hs1	-1	4

Table 7

Data Transformation for Health Status Survey

Data Transformation		
Variable Name	Original Response	Transformed Response
hs3	3	0
hs3	2	1
hs3	1	2

The resulting score is calculated using the formula:

$$\text{HS\_Score} = \left(\frac{\text{hs1} - 1}{4} + (\text{hs2} - 1) + \frac{\text{hs3} - 1}{2}\right) \div 3 \quad \{7\}$$

2.3.6.2. Chronic Disease

Chronic Disease (CD) is an objective questionnaire measuring the respondent if they have a chronic condition. To "have" a chronic disease does not strictly mean that the respondent should be suffering from the disease. The score of cd1o for both datasets will not be calculated in the score for CD as cd1o, denoting depression, is part of the dependent variable.

Table 8

Proxy Data Imputation for Chronic Disease Survey

Dataset Year	Variable Name	Response	n
2019	cd2	-3	78

Table 9

Missing Data Imputations for Chronic Disease Survey

Dataset Year	Variable Name	Response	n
2019	cd2	-1	22

Table 10

Data Transformation for Chronic Disease Survey

Dataset Year	Variable Name	Original Response	Transformed Response
2014	cd1a – cd1o	2	0
2019	cd1a – cd1p	2	0

Table 11

Data Reliability for Chronic Disease Survey

Dataset Year	Variables	Original Cronbach α	Result Cronbach α
2014	cd1a – cd1o	0.687	0.687
2019	cd1a – cd1p	0.712	0.712

The resulting score is calculated using the formula:

$$\text{CD\_Score}_{2014} = \sum_{n}^{a} \text{cd1}_{2014} \div 14 \quad \{8.1\}$$

$$\text{CD\_Score}_{2019} = \left(\sum_{\text{n}}^{\text{a}} \text{cd1}_{2019} + \text{cd1p}_{2019} + \frac{\text{cd2}_{2019} - 1}{4} \right) \div 16 \quad \{8.2\}$$

2.3.6.3. Accident and Injuries

Accident and Injuries (AC) questionnaire measures the occurrence of different kinds of accidents and injuries, excluding self-inflicted injuries or injuries due to interpersonal violence. If the respondent responded with a type of injury, the severity of injury will be documented under “ac2”.

Table 12

Missing Data Imputation for Accident and Injuries Survey

Dataset Year	Variable Name	Response	n
2014	ac2	-2	4236
2019	ac2	-2	4857

The resulting score is calculated using the formula:

$$\text{AC\_Score} = \text{ac2} \div 3 \quad \{9\}$$

2.3.6.4. Functional Limitations

Functional Limitations (PL) is an objective questionnaire measuring an individual’s physical and sensory functional limitations using the Budapest Initiative (BI). In the 2019 survey, the pl2 survey question was added to measure an individual 55 years old and older about their “Difficulty in biting and chewing on hard foods". pl2 is not part of the Budapest Initiative survey questionnaire.

Table 13

Missing Data Imputation for Functional Limitations Survey

Dataset Year	Variable Name	Response	n
2014	pl2	-2	8
2014	pl4	-2	4
2014	pl5	-2	7
2019	pl2	-2	11
2019	pl4	-2	4
2019	pl5	-2	4
2019	pl9	-2	2469

The resulting score is calculated using the formula:

$$(\text{pl1} + \text{pl2})_i = \begin{cases} 1, & \text{if pl2}_i = 3 \\ \dfrac{\text{pl2}_i - 1}{6}, & \text{if pl2}_i = 2 \\ \dfrac{\text{pl2}_i + 3}{6}, & \text{if pl2}_i = 1 \end{cases} \quad \{10.1\}$$

$$(\text{pl3} + \text{pl4} + \text{pl5})_i = \begin{cases} 1, & \text{if pl3}_\text{i} = 3 \\ \dfrac{(pl4_i + 3) + \dfrac{pl5_i + 3}{2}}{12}, & \text{if pl3}_i = 1 \\ \dfrac{(pl4_i - 1) + \dfrac{pl5_i - 1}{2}}{12}, & \text{if pl3}_i = 2 \end{cases} \quad \{10.2\}$$

where i denotes the year 2014 or 2019

$$\text{PL\_Score}_{2014} = \left((\text{pl1} + \text{pl2})_{2014} + (\text{pl3} + \text{pl4} + \text{pl5})_{2014} + \frac{\text{pl6}_{2014} - 1}{3} + \frac{\text{pl7}_{2014} - 1}{3}\right) \div 4 \quad \{11.1\}$$

$$\text{PL\_Score}_{2019} = \left((\text{pl1} + \text{pl2})_{2019} + (\text{pl3} + \text{pl4} + \text{pl5})_{2019} + \frac{\text{pl6}_{2019} - 1}{3} + \frac{\text{pl7}_{2019} - 1}{3} + \frac{\text{pl8}_{2019} - 1}{3} + \frac{\text{pl9}_{2019} - 1}{3}\right) \div 6 \quad \{11.2\}$$

2.3.6.5. Personal Care

Personal Care (PC) questionnaire measures the performance and the help received or needed concerning the main Activities of Daily Living (ADL) according to the International Classification of Functioning, disability and Health (ICF).

Table 14

Proxy Data Imputation for Personal Care Survey

Dataset Year	Variable Name	Response	n
2019	pc3	-3	64

Table 15

Missing Data Imputation for Personal Care Survey

Dataset Year	Variable Name	Response	n
2014	pc1a – pc1e	-2	3734
2014	pc2	-2	4069
2014	pc3	-1	83
2014	pc3	-2	4678
2019	pc1a – pc1e	-2	2469
2019	pc2	-2	4067
2019	pc3	-1	11
2019	pc3	-2	4067

Table 16

Data Transformation for Personal Care Survey

Dataset Year	Variable Name	Original Response	Transformed Response
2014	pc2 – pc3	2	0
2019	pc2 –pc3	2	0

Table 17

Data Reliability for Personal Care Survey

Dataset Year	Variables	Original Cronbach α	Result Cronbach α
2014	pc1a – pc1e	0.943	0.931
2019	pc1a – pc1e	0.936	0.935

The resulting score is calculated using the formula:

$$(\text{pc2} + \text{pc3}) = \begin{cases} 0, \text{if pc2} = 0 \text{ and pc3} = 0 \\ \frac{1}{3}, \text{if pc2} = 0 \text{ and pc3} = 1 \\ \frac{2}{3}, \text{if pc2} = 1 \text{ and pc3} = 0 \\ 1, \text{if pc2} = 1 \text{ and pc3} = 1 \end{cases} \quad \{12.1\}$$

$$\text{PC\_Score} = \left(\left(\sum_{\text{e}}^{\text{a}} \text{pc1} \right) \div 20 \right) \times (\text{pc2} + \text{pc3}) \quad \{12.2\}$$

2.3.6.6. Household Activities

Household Activities (HA) is an objective questionnaire measuring the performance and the help received or needed concerning the main instrumental activities of daily living (IADL) according to the International Classification of Functioning, Disability and Health (ICF3).

Table 18

Proxy Data Imputation for Household Activities Survey

Dataset Year	Variable Name	Response	n
2019	Ha3	-3	68

Table 19

Missing Data Imputation for Household Activiies Survey

Dataset Year	Variable Name	Response	n
2014	ha1a – ha1g	-2	3734
2014	ha2	-1	12
2014	ha2	-2	4219
2014	ha3	-1	87
2014	ha3	-2	4214
2019	ha1a – ha1g	-2	2469
2019	ha2	-2	3360
2019	ha3	-1	15
2019	ha3	-2	3360

Table 20

Data Transformation for Household Activities Survey

Dataset Year	Variable Name	Original Response	Transformed Response
2014	ha2 – ha3	2	0
2019	ha2 – ha3	2	0

Table 21

Data Reliability for Household Activities Survey

Dataset Year	Variables	Original Cronbach α	Result Cronbach α
2014	ha1a – ha1g	0.885	0.863
2019	ha1a – ha1g	0.863	0.864

The resulting score is calculated using the formula:

$$(\text{ha2} + \text{ha3}) = \begin{cases} 0, \text{if ha2} = 0 \text{ and ha3} = 0 \\ \frac{1}{3}, \text{if ha2} = 0 \text{ and ha3} = 1 \\ \frac{2}{3}, \text{if ha2} = 1 \text{ and ha3} = 0 \\ 1, \text{if ha2} = 1 \text{ and ha3} = 1 \end{cases} \quad \{13.1\}$$

$$\text{HA\_Score} = \left(\left(\sum_{g}^{a} \text{ha1} \right) \div 35 \right) \times (\text{ha2} + \text{ha3}) \quad \{13.2\}$$

2.3.6.7. Pain

Pain (PN) is an objective questionnaire measuring bodily (physical) pain according to the SF-36vTM 2 Health Survey © 1996,2000 by Quality Metric Incorporated and Medical Outcomes Trust. This survey focuses the intensity of bodily pain, and the extent pain interfered with normal work.

The resulting score is calculated using the formula:

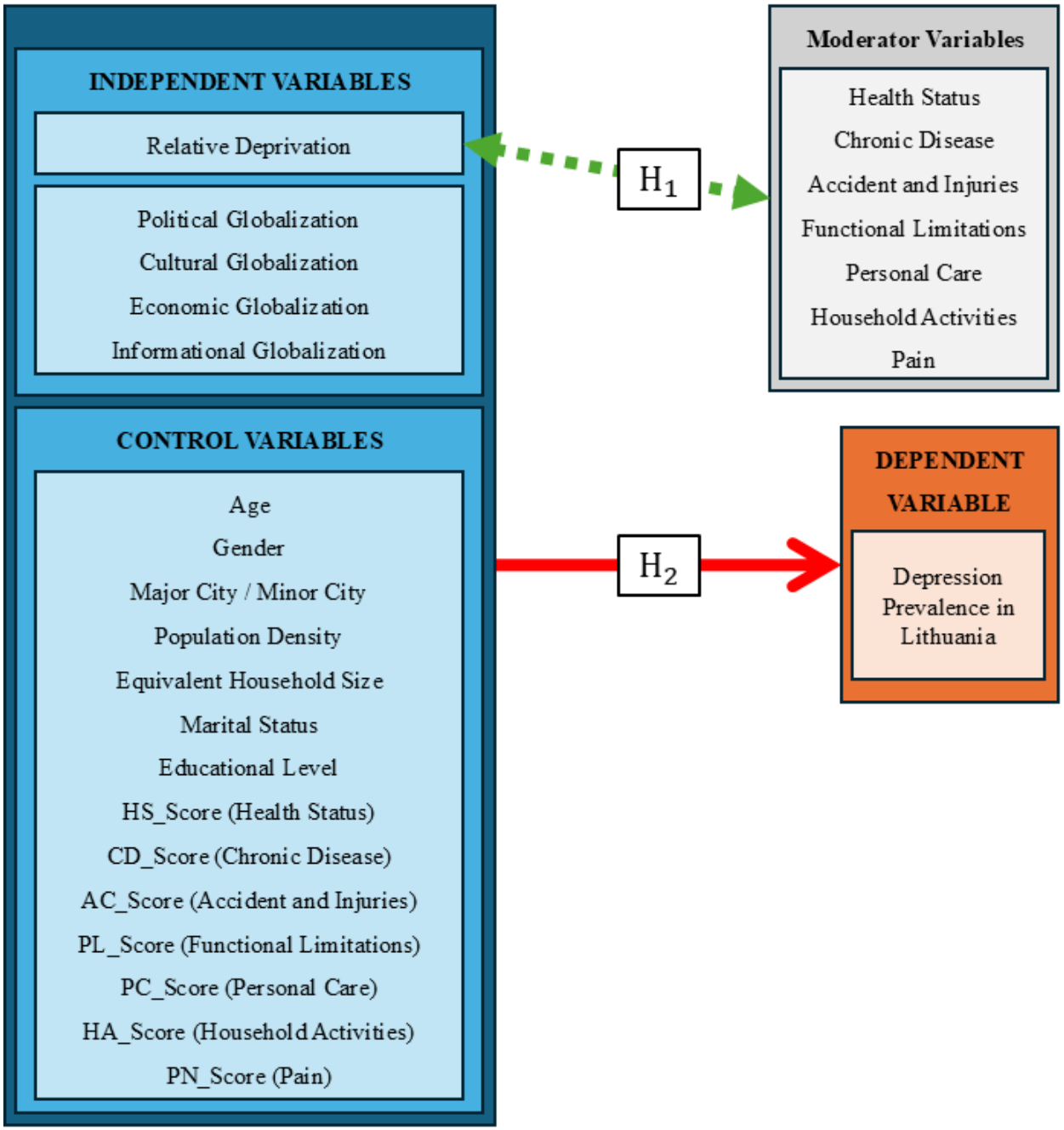
$$\text{PN\_Score} = \left(\frac{\text{pn1} - 1}{5} \right) \times \left(\frac{\text{pn2} - 1}{4} \right) \quad \{14\}$$

2.4. Proposed Conceptual Framework

Based on the discussion above, a conceptual framework is designed to illustrate the hypothesis of the dependent and independent variables, and moderator relationship between the health status variables and relative deprivation variable. Secondary data sources are available online (Lietuvos atvirų duomenų portalas, 2019a), (Lietuvos atvirų duomenų portalas, 2019b), (Lietuvos statistikos departamentas, 2015) and (Lietuvos statistikos departamentas, 2020).

Figure 1

Contextual Framework



2.5. Hypotheses Development

The paper aims to understand the effects of globalization and relative deprivation on the prevalence of depressive disorders, while looking for potential moderation effects in the population of Lithuania.

From the contextual framework, the hypothesis are as follows:

Table 22

List of Hypotheses

Hypothesis	Sub-hypothesis
H_1: Relative deprivation moderates the association between health status and the probability of depressive disorder.	$H_{1.1}$: Relative deprivation moderates the association between Health Status Score and the probability of depressive disorder
	$H_{1.2}$: Relative deprivation moderates the association between Chronic Disease Score and the probability of depressive disorder
	$H_{1.3}$: Relative deprivation moderates the association between Accident and Injuries Score and the probability of depressive disorder
	$H_{1.4}$: Relative deprivation moderates the association between Functional Limitations Score and the probability of depressive disorder
	$H_{1.5}$: Relative deprivation moderates the association between Personal Care Score and the probability of depressive disorder
	$H_{1.6}$: Relative deprivation moderates the association between Household Activity Score and the probability of depressive disorder
	$H_{1.7}$: Relative deprivation moderates the association between Pain Score and the probability of depressive disorder
H_2: Globalization and Relative Deprivation has a positive relationship on the prevalence of depression in Lithuania.	$H_{2.1}$: There is a positive relationship between Economic Globalization and Depression Prevalence
	$H_{2.2}$: There is a positive relationship between Informational Globalization and Depression Prevalence
	$H_{2.3}$: There is a positive relationship between Cultural Globalization and Depression Prevalence
	$H_{2.4}$: There is a positive relationship between Political Globalization and Depression Prevalence
	$H_{2.5}$: There is a positive relationship between Relative Deprivation and Depression Prevalence

H_1 aims to observe strength of the relationship between poorer health status and higher depression risk increases as levels of relative deprivation rise. H_2 aims to observe strength of the relationship between increasing globalization activity and increasing depression disorder prevalence.

3: EMPIRICAL RESEARCH METHODOLOGY

3.1. Introduction

This chapter describes the approach used to examine the links between globalization, relative deprivation, health status on the prevalence of depressive disorders. Additionally, it also

examines the strength of the moderation effect of health status score with relative deprivation on the depressive disorder prevalence in Lithuania. The analysis consists of two main stages. First, separate logistic regression models assess moderation effects between each health-status dimension and relative deprivation. Second, a single-level generalised linear model with a binomial distribution and probit link is estimated with SPSS' GENLIN to evaluate the joint effects of globalization indexes, relative deprivation, health status scores moderator, and control variables on the binary probability of depression.

3.2. Type of Analysis

Moderator analysis to examine H_1 used a binary logistic regression with depression as the dependent variable, each of the seven health status scores and relative deprivation as predictors, and the product term of health status score and relative deprivation as the moderator effect interaction.

The main analysis, used to examine H_2, comprised of four single-index probit models estimated in SPSS' GENLIN function, using a binomial distribution and probit link. Each of the four models included one of the four globalization index (economic, informational, cultural, political), the relative deprivation index, seven health status scores, seven moderator effect interaction terms and the demographic variables.

3.3. Model Specification

3.3.1. Moderator Analysis

For the moderation analysis, seven separate logistic regressions were conducted to test interaction effects between each health status score and its corresponding relative deprivation moderator. The regression of the model is as such:

$$\log\left(\frac{\Pr(Y_i = 1)}{1 - \Pr(Y_i = 1)}\right) = \alpha_0 + \alpha_1 \text{hsScore}_i + \alpha_2 \text{RD}_i + \alpha_3(\text{hsScore}_i \times \text{RD}_i) \qquad \{15.1\}$$

Substituting from equation 3 to obtain the product of the interaction term between health status score and relative deprivation:

$$\therefore \log\left(\frac{\Pr(Y_i = 1)}{1 - \Pr(Y_i = 1)}\right) = \alpha_0 + \alpha_1 \text{hsScore}_i + \alpha_2 \text{RD}_i + \alpha_3 \text{M}_i \quad \{15.2\}$$

Where a significant α_3 indicates the moderation effect of health status on depression varies by level of deprivation.

3.3.2. Binary Probit Regression Analysis

For the four single-index probit models, four separate single-level generalised linear regression were used. The binomial distribution ensures valid estimation of probabilities within the zero to one range and the probit link provides a robust transformation for the latent variables such as HS_Score or RD interpretation of depression risk. The analysis proceeded in three incremental stages, starting first with a null model, followed by a covariate only model, and lastly a full model incorporating the measures of globalization indexes and relative deprivation. With each model, the distribution was set to binomial with a probit link. Fisher scoring maximum-likelihood estimation was used with a maximum of 25 iterations and absolute convergence criterion of 1×10^{-6}. Scale weight was applied using the survey weight variable, "wgt".

Firstly, the regression of the null model is as such:

$$\phi^{-1}[\Pr(Y_i = 1)] = \beta_0 \quad \{16.1\}$$

Secondly, the regression of the covariate-only model is as such:

$$\phi^{-1}[\Pr(Y_i = 1)] = \beta_0 + \sum_{k=1}^{K} \beta_k X_{ki} \quad \{16.2\}$$

Lastly, the regression of the four separate single-index probit models is as such:

$$\phi^{-1}[\Pr(Y_i = 1)] = \beta_0 + \sum_{k=1}^{K} \beta_k X_{ki} + \sum_{m=1}^{7} \theta_m (\text{hsScore}_{m,i} \times \text{RD}_i) + \delta \text{RD}_i + \gamma_1 \text{EconGlob}_i \quad \{16.3.1\}$$

$$\phi^{-1}[\Pr(Y_i = 1)] = \beta_0 + \sum_{k=1}^{K} \beta_k X_{ki} + \sum_{m=1}^{7} \theta_m (\text{hsScore}_{m,i} \times \text{RD}_i) + \delta \text{RD}_i + \gamma_2 \text{InforGlob}_i \quad \{16.3.2\}$$

$$\phi^{-1}[\Pr(Y_i = 1)] = \beta_0 + \sum_{k=1}^{K} \beta_k X_{ki} + \sum_{m=1}^{7} \theta_m (\text{hsScore}_{m,i} \times \text{RD}_i) + \delta \text{RD}_i + \gamma_3 \text{CulGlob}_i \quad \{16.3.3\}$$

$$\phi^{-1}[\Pr(Y_i = 1)] = \beta_0 + \sum_{k=1}^{K} \beta_k X_{ki} + \sum_{m=1}^{7} \theta_m (\text{hsScore}_{m,i} \times \text{RD}_i) + \delta \text{RD}_i + \gamma_4 \text{PolGlob}_i \quad \{16.3.4\}$$

where:

$\phi^{-1}[\Pr(Y_i = 1)]$ is the inverse standard normal cumulative distribution function that transforms the predicted probabilities of depressive disorder from binary values into corresponding latent z-scores on the standard normal scale,

i denotes the year 2014 or 2019,

X_k denotes the covariates such as LivingUrbanDegree, HHEqualizedSize, HS_Score

A significant $\gamma_1, \gamma_2, \gamma_3, \gamma_4$, and δ indicates the positive or negative effect of the four globalization indexes and relative deprivation on the prevalence of depressive disorders.

3.4. Variable Preparation

Firstly, each of the seven health status scores maintained a range from zero to one by dividing each of the seven raw scores by its maximum possible value. Secondly, continuous predictors such as the globalization indexes, relative deprivation indexes, household size, were kept as its raw calculated outcome. Lastly, categorical variables such as age, gender, marital status, education level, employment status, and city were binary and dummy coded.

3.4.1. Treatment of the Relative Deprivation Index

The relative-deprivation index was calculated using the Yitzhaki method on income distributions and retained on its original zero to four hundred scale. The rationale for retaining the index on its original 0 – 400 scale preserves the direct interpretability of the index in its raw calculated index as the roles as both a main effect and moderator. In the full model, relative

deprivation is used as both the main effect and a moderator with the seven health status scores to examine for moderation effects.

3.5. Data Collection and Sample

The main secondary data is obtained from a nationally conducted European Health Interview Survey (EHIS). The data in the two years, 2014 and 2019, were collected from EHIS Wave 2 and EHIS Wave 3 respectively. In EHIS Wave 2, 5205 responses were collected. In EHIS Wave 3, 4599 responses were collected. Both surveys are representative of the population aged 15 to 99. Secondary data of globalization indexes were obtained from the KOF Globalisation Index. The final secondary data to calculate relative deprivation were obtained from "Population Income and Living Conditions" of Lithuania. Response rates exceeded 60%. Post-stratification weights accounted for non-response and population margins on age, gender, and region.

3.6. Ethical Considerations

No identifiable information is available in the datasets "European Health Interview Survey" and "Population Income and Living Conditions". Additionally, all information are publicly available online.

3.7. Limitations and Methodological Constraints

Firstly, self-reported measures from the "European Health Interview Survey" may be subject to reporting bias. Secondly, EHIS Wave 3 survey's response had higher counts of "no response", "not available" or "proxy" responses. Despite this, the statistical reliability, Cronbach alpha, of the responses remain acceptable. Thirdly, since the respondents' incomes were recorded in quintiles, there is a lack of micro-level scrutiny of relative deprivation, compared to the micro-level scrutiny of each respondents' health score. Fourth, the initial responses for the health status score's, chronic disease, statistical reliability fell short of 0.70. The Cronbach alpha for chronic disease responses in EHIS Wave 2 and EHIS Wave 3 were both 0.687. However, after imputations of missing variables using the Expectation-Maximization Method, the

Cronbach alpha improved to 0.712 for both years of data. Fifth, having only data of two years, 2014 and 2019, examining the quadratic effects of globalization, similar to the study conducted by (Amin, 2023), would not be feasible as a parabola line requires at least three data points. Lastly, with only data of two years, the residual degrees of freedom are near to zero to estimate the slopes reliably. It is hopeful that with the publication of EHIS Wave 4, the fifth and sixth constraints would be solved.

4: RESULTS AND DISCUSSION

4.1. Descriptive Statistics and Sample Characteristics

The descriptive statistics for the dependent variable, depression, and five independent variables, economic globalization, informational globalization, cultural globalization, political globalization and relative deprivation are shown in the table below.

Table 23

Descriptive Statistics

Variable	N=9804			
	Mean	Standard Deviation	Min	Max
Depression	0.1908	-	0	1
Economic Globalization (EconGlob)	0.7844	0.0201	0.7655	0.8058
Informational Globalization (InforGlob)	0.8269	0.0156	0.8102	0.8417
Cultural Globalization (CulGlob)	0.8960	0.0068	0.8896	0.9033
Political Globalization (PolGlob)	0.8276	0.0070	0.8210	0.8351
Relative Deprivation	169.2270	114.88	0	397.9206

4.2. Moderator Effect Analysis

Table 24

Moderator Effects Analyses

Interaction	α_3	Std. Error	Wald	p-value	Exp(B)
Health Status Dimension					
HS_Score	-0.740	0.015	2543.001	< 0.001	0.477
Relative Deprivation	-0.003	0.000	10687.354	< 0.001	0.997
HS_RD_Moderator	0.007	0.000	7897.594	< 0.001	1.007
Constant	-1.061	0.005	38775.726	< 0.001	0.346
Chronic Disease Dimension					
CD_Score	0.401	0.018	475.224	< 0.001	1.493
Relative Deprivation	-0.002	0.000	26506.519	< 0.001	0.998
CD_RD_Moderator	0.009	0.000	13480,185	< 0.001	1,009
Constant	-1.284	0.002	279151.930	< 0.001	0.277
Accident and Injury Dimension					
AC_Score	3.108	0.007	175868.250	< 0.001	22.374
Relative Deprivation	0.001	0.000	1083.195	< 0.001	1.001
AC_RD_Moderator	-0.004	0.000	11902.874	< 0.001	0.996
Constant	-2.680	0.004	279151.930	< 0.001	0. 069
Functional Limitations Dimension					
PL_Score	-1.644	0.016	11130.349	< 0.001	0.193
Relative Deprivation	-0.002	0.000	24945.549	< 0.001	0.998
PL_RD_Moderator	-.011	0.000	26683.506	< 0.001	1.011
Constant	-1.129	0.002	213823.860	< 0.001	0.323
Personal Care Dimension					
PC_Score	8.645	0.019	197761.858	< 0.001	5681.558
Relative Deprivation	0.001	0.000	2974.961	< 0.001	1.001
PC_RD_Moderator	-0.017	0.000	42789.287	< 0.001	0.984
Constant	-2.155	0.003	502669.734	< 0.001	0.116
Household Activities Dimension					
HA_Score	6.993	0.018	143431.667	< 0.001	1089.283
Relative Deprivation	0.000	0.000	207.445	< 0.001	1.000
HA_RD_Moderator	-0.012	0.000	22640.704	< 0.001	0.988
Constant	-2.107	0.003	437592.314	< 0.001	0.122
Pain Dimension					
PN_Score	-0.578	0.011	2616.404	< 0.001	0.561
Relative Deprivation	-0.002	0.000	20100.645	< 0.001	0.998
PN_RD_Moderator	0.007	0.000	21181.035	< 0.001	1.007
Constant	-1.239	0.002	326602.482	< 0.001	0.290

All the seven product interactions are positive and significant. In its raw calculation, a higher numerical value of both relative deprivation and health status scores indicates a worse level of relative income deprivation and health status dimension respectively. This indicates that relative deprivation has a moderating effect on all seven health status dimensions. A higher relative deprivation increases the risk of increasing the prevalence of depressive disorder in the Lithuanian population.

4.3. Binary Probit Regression Analysis

4.3.1. Null Model

Table 25

Null Model

Statistic	Value	df	Value/df
Deviance	-	-	-
Pearson χ^2	-	-	-
Log likelihood	-7.680		
Akaike's Information Criterion (AIC)	17.360	-	-
Bayesian Information Criterion (BIC)	24.551	-	-
Consistent AIC (CAIC)	25.551	-	-
Akaike's Information Criterion (AIC)	17.360	-	-
Intercept (B)	0.856	-	-
SE (Intercept)	0.0007	-	-
Wald χ^2 (Intercept)	1681395.61	-	-
p-value	< 0.001	-	-

Firstly, a null model was conducted to provide the intercept-only baseline fit.

4.3.1. Covariates Model

Table 26

Covariates Model

Statistic	Value	df	Value/df
Deviance	3735916.81	9376	398.46
Pearson χ^2	4627599.90	9376	493.56
Log likelihood	-1868034.78	-	-
AIC	3736131.56	-	-
BIC	3736354.47	-	-
CAIC	3736385.47	-	-
Omnibus LR χ^2(30 df)	909289.48	-	-
p-value	< 0.001	-	-

The subsequent stage is the covariates model, where control variables and health status scores are fitted into the model.

4.3.2. Single-Index Probit Model

The final stage is the single-index probit model, where four separate models for each of the four globalization indexes and relative deprivation index are fitted into the model.

4.3.2.1. Economic Globalization

Table 27

Economic Globalization Probit Model

Statistic			Value	
Deviance			3465173.67	
Log likelihood			-1732663.21	
AIC			3465392.41	
BIC			3465629.70	
CAIC			3465662.70	
Predictor	γ_1	SE	Wald χ^2	p
EconGlob	-34.330	0.0707	235940.17	<0.001

4.3.2.2. Informational Globalization

Table 28

Informational Globalization Probit Model

Statistic			Value	
Deviance			3465173.67	
Log likelihood			-1732663.21	
AIC			3465392.41	
BIC			3465629.70	
CAIC			3465662.70	
Predictor	γ_2	SE	Wald χ^2	p-value
InforGlob	44.030	0.0906	235940.17	<0.001

4.3.2.3. Cultural Globalization

Table 29

Cultural Globalization Probit Model

Statistic			Value	
Deviance			3465173.67	
Log likelihood			-1732663.21	
AIC			3465392.41	
BIC			3465392.64	
CAIC			3465662.70	
Predictor	γ_3	SE	Wald χ^2	p
CulGlob	-100.877	0.2077	235940.17	<0.001

4.3.2.4. Political Globalization

Table 30

Political Globalization Probit Model

Statistic			Value	
Deviance			3465173.67	
Log likelihood			-1732663.21	
AIC			3465392.41	
BIC			3465629.70	
CAIC			3465662.70	
Predictor	γ_4	SE	Wald χ^2	p-value
PolGlob	-98.231	0.2022	235940.17	<0.001

4.3.2.5. Relative Deprivation

Table 31

Relative Deprivation Coefficient

Predictor	δ	SE	Wald χ^2	p-value
Relative Deprivation	0.001	2.3×10^{-5}	510.064	<0.001

4.3.2.6. Moderator Effect Variables

Table 32

Moderator Effect Variables Coefficient

Interaction	θ	Std. Error	Wald χ^2	p-value
HS_RD_Moderator	-0.002	5.1255×10^{-5}	1515.598	< 0.001
CD_RD_Moderator	-0.002	7.2269×10^{-5}	1004.754	< 0.001
AC_RD_Moderator	0.001	2.6651×10^{-5}	2631.532	< 0.001
PL_RD_Moderator	0.000	6.3472×10^{-5}	52.094	< 0.001
PC_RD_Moderator	-0.001	7.3051×10^{-5}	70.568	< 0.001
HA_RD_Moderator	0.006	8.9701×10^{-5}	4919.140	< 0.001
PN_RD_Moderator	-0.004	3.7170×10^{-5}	9432.116	< 0.001

4.4. Discussion of Results

4.4.1. Relative Deprivation

Across all four models, relative deprivation index had a small but consistent statistically significant positive effect. The small δ coefficient, 0.001, is due to three factors. Firstly, the variable ranges from zero to 400. The raw calculation of the index was retained to preserve the direct interpretability of the index in both its roles as a main and moderator effect. Secondly, the

number of respondents whose income falls below the third quintile is 3910 out of 9804. Lastly, as the recorded data captures the quintile group the respondent's income falls into, the actual relative deprivation index of each respondent's has not been fully captured. Despite the limitation of the data, the number of respondents, 9804, is sufficient to interpret the macro effects of relative deprivation in both years, 2014 and 2019. The observed positive δ coefficient implies that relative deprivation contributes to depressive disorder prevalence.

The observation that relative deprivation would cause an increase in depressive disorder prevalence is supported by Borghesi and Vercelli (2004) and Klijs et al. (2016), who explain that lower income groups may experience self-exclusion from health related or sporting events, loss of self-esteem, and an increase in negative emotions when comparing themselves to higher income peers, engaging in pessimistic self-reflection when living near higher income groups. These factors contribute to the increase in the prevalence of depressive disorders among low-income earners.

4.4.2. Globalization

Across all four models, each globalisation dimension exhibits a statistically significant association with depression risk when modelled separately, after adjusting for demographics, health status, and deprivation. The direction changes by dimension, highlighting the distinct relationship between each globalisation dimension and the prevalence of depressive disorder. Between each model, all observations display a large numerical value and are statistically significant. The numerically large gamma coefficient, ranging from -98.231 to 100.877, is due to the numerical range of each index from zero to one.

4.4.2.1. Economic Globalization

The increase in economic globalisation leads to an increase in free trade by decreasing non-tariff trade barriers, taxes on international trade, and tariff rates. Additionally, it increases foreign ownership of businesses, financial openness, and openness to investment in and out of the country (Gygli et al., 2019).

The observation that economic globalisation would cause a decrease in depressive disorder prevalence follows the findings of the study conducted by Amin (2023). This observation may result from the reduction in trade barriers, increase in economic openness, and growth in foreign investment, which increase the diversity and availability of jobs and employment respectively, and raise income levels in the population. Additionally, higher income levels allow for increased tax collection, which could be used to tackle income inequality and improve social safety nets, thereby reducing the prevalence of depression.

4.4.2.2. Informational Globalization

The increase in informational globalisation is characterised by improved access to information through television, internet connectivity, and increased media consumption measured as internet bandwidth in bits per second per capita, b/s/capita. The measurement is also influenced by the legal environment surrounding political and economic pressures that affect access to news and information (Gygli et al., 2019).

The observation that informational globalisation would cause an increase in depressive disorder prevalence follows the findings of studies conducted by Burke et al. (2010) and Tugtekin et al. (2020). The rise in media consumption, particularly through social media, increases the occurrence of Fear of Missing Out (FoMO) as discussed by Przybylski et al. (2013), and the consumption of negative media content. Additionally, social comparisons between individuals online, which are closely related to the effects of relative deprivation, create a feedback loop that contributes to increased depression prevalence.

4.4.2.3. Cultural Globalization

The increase in cultural globalisation is reflected by a higher ratio of girls to boys enrolled in schools, government expenditure on education per capita, and indicators such as freedom of expression and belief, associational and organisational rights, rule of law, personal autonomy, and individual rights (Gygli et al., 2019).

The observation that cultural globalisation would cause a decrease in depressive disorder prevalence follows the findings of the study conducted by Chisadza & Bittencourt (2018). While their study focused on the reduction of conflict as social globalisation increased, cultural globalisation is a subset of social globalisation. Their findings suggest that increased access to information about conflict encouraged public campaigns against war. Similarly, increased awareness of depression as a treatable condition, the breakdown of stigma, and the establishment of new social norms regarding mental illness contribute to the reduction in depression prevalence.

4.4.2.4. Political Globalization

The increase in political globalisation refers to growth in the number of international government organisation memberships, international treaties, and bilateral investment agreements (Gygli et al., 2019).

The observation that political globalisation would cause a decrease in depressive disorder prevalence follows the findings of the study conducted by Amin (2023). This may be the result of improvements in governance within the health sector. For example, according to the Ministry of Health of the Republic of Lithuania, the Health programme LT03 is part of an investment of 117.6 million euros in Lithuania. Part of the investment was aimed at providing “free and confidential services for young people addressing social, psychological, or other health issues”, and at “developing effective emotional counselling services for people experiencing early signs of depression and anxiety”. Additionally, according to the Lithuanian Health Strategy 2014-2025, resolution XII 964, the goals of the Health Ministry are aligned with “Europe 2020 - A European strategy for smart, sustainable and inclusive growth”. These examples of political globalisation demonstrate the increase in international health policy harmonisation and funding aimed at tackling mental health challenges, thereby contributing to the reduction in depression prevalence.

4.4.3. Moderator Effect Variables

Across all four models, the seven moderator effect variables, similar to relative deprivation, had a small but consistent statistically significant positive effect. The small θ coefficient, ranging from -0.002 to 0.006,, results from the product of the moderation interaction term. Firstly, the variable relative deprivation ranges from zero to 400 and each health score ranges from zero to one. The sum of the two variables multiplied together produces a range from zero to 40. The observed statistically significant coefficient for all seven moderation effects in the final regression implies that relative deprivation does have a moderating effect on individual health.

4.5. Limitations and Future Studies

Due to having only two data points for the globalisation indexes, years 2014 and 2019, there is near zero variance between the data. A full multi-index probit model was not feasible. Therefore, four single index probit models were conducted. The upcoming publication of EHIS Wave 4 should allow greater variance in the globalisation indexes, making a full multi-index model feasible in which all globalisation dimensions can be calculated as a concurrent phenomenon. With an additional data point, the squared effects of globalisation on depression prevalence could be examined. The upcoming publication of EHIS Wave 4 will provide insight into the effects of post pandemic policies, income related deprivation, and the prevalence of depressive disorders compared to pre pandemic data. Additionally, the direction and magnitude of the moderation effects between relative deprivation and health status on depression outcomes would be a new area of research.

5: CONCLUSIONS

1. The empirical analysis tests for moderating effects between an individual's health status dimension and relative deprivation. The empirical analysis also tests for the direction and magnitude of the five independent variables on the dependent variable,

depression: economic globalization, cultural globalization, informational globalization, political globalization, and relative deprivation.

2. The presented result from empirical research highlights the major importance for depressive disorder prevalence in Lithuania are cultural and political globalization. The coefficients of cultural and political globalization, -100.877 and -98.23 respectively, compared to the coefficients of cultural and informational globalization, were -34.33 and 44.03 respectively. Additionally, policy improvements are needed on informational technologies to curb the impact of media through social networking sites or television on depression prevalence.
3. Findings from empirical research are as follows:
    a. There are moderation interaction effects between the health statuses of the individual and relative deprivation. The findings presented in Table 32**Table *24*** concur with hypotheses $H_{1.1}$ to $H_{1.7}$.
    b. Relative deprivation was observed to contribute to depression prevalence in Lithuania, ($\delta = 0.001$, p-value < 0.001). The findings presented in Table 28 concur with hypothesis $H_{2.2}$
    c. Informational globalization was observed to contribute to depression prevalence in Lithuania, ($\gamma_2 = 44.03$, p-value < 0.001). The findings presented in Table 31 concur with hypothesis $H_{2.5}$.
    d. Economic, cultural and political globalization was observed to decrease the depression prevalence in Lithuania, ($\gamma_1 = -34.33$, $\gamma_3 = -100.877$, $\gamma_4 = -98.23$, p-values < 0.001). The findings presented in Table 27, Table 29, and Table 30 do not concur with hypotheses $H_{2.1}$, $H_{2.3}$, and $H_{2.4}$ respectively.
4. Relative deprivation causes occurrences of self-exclusion from health-related or sporting events, loss of self-esteem and increase in negative emotions when comparing themselves to their higher-income peers and engaging in pessimistic self-

reflection when living near high-income contributing to the increase in depressive disorders prevalence.

5. Informational globalization causes occurrences of Fear of Missing Out (FoMO) and increased consumption of negative media resources through the increased media consumption from social media. The increased consumption of negative media resources through social media creates a negative feedback loop among the individual, contributing to increased risk of depressive symptoms.
6. Economic globalization increases the nation's employment and investment opportunities, increasing income levels and eventually improving social safety nets, contributing to the decrease in depression prevalence.
7. Cultural globalization increases access to new norms dealing with depression, breaking stigmas against depression and educating the population on the manageability of depression, contributing to the decrease in depression prevalence.
8. Political globalization increases in international health policy harmonization, international funding towards tackling mental health diseases, contributing to the decrease in depression prevalence.

Reference List

Adjaye-Gbewonyo, K., & Kawachi, I. (2012). Use of the Yitzhaki Index as a test of relative deprivation for health outcomes: A review of recent literature [Article]. *Social Science & Medicine (1982)*, *75*(1), 129–137. https://doi.org/10.1016/j.socscimed.2012.03.004

Alam, F., Hossain, R., Ahmed, H. U., Alam, M. T., Sarkar, M., & Halbreich, U. (2020). Stressors and mental health in Bangladesh: current situation and future hopes. *BJPsych International*, *18*(4), 1–4. https://doi.org/10.1192/bji.2020.57

Amin, S. (2023). Globalisation and mental health: is globalisation good or bad for mental health? Testing for quadratic effects. *Health Economics, Policy and Law*, *19*(1), 1–32. https://doi.org/10.1017/S1744133123000294

Baxa, M., Chipman, A., Lovell, A., & Puhl, T. (2022). *Depression in europe*. https://impact.economist.com/projects/depression-in-europe/files/janssen-depression_in_europe_report.pdf

Bhavsar, V., & Bhugra, D. (2008). Globalization: Mental Health and Social Economic Factors. *Global Social Policy*, *8*(3), 378–396. https://doi.org/10.1177/1468018108095634

Bhugra, D. (2016). Mental health for nations. *International Review of Psychiatry*, *28*(4), 342–374. https://doi.org/10.1080/09540261.2016.1211095

Bhugra, D., & Mastrogianni, A. (2004). Globalisation and mental disorders. *British Journal of Psychiatry*, *184*(1), 10–20. https://doi.org/10.1192/bjp.184.1.10

Borghesi, S., & Vercelli, A. (2004). Globalisation, inequality and health. *International Journal of Global Environmental Issues*, *4*(1/2/3), 89. https://doi.org/10.1504/ijgenvi.2004.005286

Burke, M., Marlow, C., & Lento, T. (2010). Social network activity and social well-being. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 1909–1912. https://doi.org/10.1145/1753326.1753613

Cheung, F., & Lucas, R. E. (2016). Income Inequality Is Associated With Stronger Social Comparison Effects: The Effect of Relative Income on Life Satisfaction [Article]. *Journal*

of Personality and Social Psychology, *110*(2), 332–341. https://doi.org/10.1037/pspp0000059

Chisadza, C., & Bittencourt, M. (2018). Globalisation and Conflict: Evidence from Sub-Saharan Africa. *Revue Internationale de Politique de Développement*, *10.1*. https://doi.org/10.4000/poldev.2706

Davis, J. A. (1959). A formal interpretation of the theory of relative deprivation. *Sociometry*, *22*(4), 280. https://doi.org/10.2307/2786046

Eibner, C., Sturn, R., & Gresenz, C. R. (2004). Does relative deprivation predict the need for mental health services? *The Journal of Mental Health Policy and Economics*, *7*(4), 167–175. https://pubmed.ncbi.nlm.nih.gov/15701932/

Gravelle, H. (1998). How much of the relation between population mortality and unequal distribution of income is a statistical artefact? *BMJ*, *316*(7128), 382–385. https://doi.org/10.1136/bmj.316.7128.382

Gravelle, H., & Sutton, M. (2009). Income, relative income, and self-reported health in Britain 1979-2000 [Article]. *Health Economics*, *18*(2), 125–145. https://doi.org/10.1002/hec.1354

Guerra, O., & Eboreime, E. (2021). The impact of economic recessions on depression, anxiety, and trauma-related disorders and illness outcomes—a scoping review. *Behavioral Sciences*, *11*(9), 119. https://doi.org/10.3390/bs11090119

Gygli, S., Haelg, F., Potrafke, N., & Sturm, J.-E. (2019a). The KOF Globalisation Index – revisited. *The Review of International Organizations*, *14*(3), 543–574. https://doi.org/10.1007/s11558-019-09344-2

Gygli, S., Haelg, F., Potrafke, N., & Sturm, J.-E. (2019b). The KOF Globalisation Index – revisited. *The Review of International Organizations*, *14*(3), 543–574. https://doi.org/10.1007/s11558-019-09344-2

Huang, L., Zhang, X., Zhou, M., Nuse, B., & Tong, L. (2019). Depressive Symptoms and Migrant Worker Wages: Estimation Based on a NationallyRepresentative Panel Dataset.

International Journal of Environmental Research and Public Health, *16*(6), 1009. https://doi.org/10.3390/ijerph16061009

Iwamasa, G. Y., Regan, S. M. P., Subica, A., & Yamada, A.-M. (2019). Handbook of Multicultural Mental Health. In *Pediatric Anxiety Disorders* (Second Edition, pp. 167–188). Elsevier Inc. https://doi.org/10.1016/B9780123944207.000096

Kawachi, I., & Subramanian, S. V. (2014). Income Inequality. In *Social Epidemiology* (pp. 126–152). Oxford University Press. https://doi.org/10.1093/med/9780195377903.003.0004

Klijs, B., Kibele, E. U. B., Ellwardt, L., Zuidersma, M., Stolk, R. P., Wittek, R. P. M., Mendes de Leon, C. M., & Smidt, N. (2016). Neighborhood income and major depressive disorder in a large Dutch population: results from the LifeLines Cohort study. *BMC Public Health*, *16*(1). https://doi.org/10.1186/s12889-016-3332-2

Kroenke, K., Strine, T. W., Spitzer, R. L., Williams, J. B. W., Berry, J. T., & Mokdad, A. H. (2009). The PHQ-8 as a measure of current depression in the general population. *Journal of Affective Disorders*, *114*(1–3), 163–173. https://doi.org/10.1016/j.jad.2008.06.026

Lietuvos atvirų duomenų portalas. (2019a). *Gyventojų sveikatos statistinio tyrimo duomenys* [GyventojuSveikata2014]. Retrieved October 1, 2024, from https://data.gov.lt/datasets/1622/

Lietuvos atvirų duomenų portalas. (2019b). *Gyventojų sveikatos statistinio tyrimo duomenys* [GyventojuSveikata2019]. Retrieved October 1, 2024, from https://data.gov.lt/datasets/1622/

Lietuvos statistikos departamentas. (2015). *Gyventojų pajamos ir gyvenimo sąlygos Income and Living Conditions 2014*. https://osp.stat.gov.lt/services-portlet/pub-edition-file?id=20860

Lietuvos statistikos departamentas. (2020). *Income and living conditions of the population of Lithuania 2020 edition*. https://osp.stat.gov.lt/documents/10180/8548611/Income+and+living+conditions+of+the+p

opulation+of+Lithuania+%28edition+2020%29.pdf/b33eeab7-2bac-43bf-9411-d2c541630b5f

Lin, Y., Chang, Y., & Yan, H. (2020). Is trade a blessing or a curse? A panel data analysis of the determinants of depressive disorders. *International Journal of Public Health, 65*(7), 1113–1121. https://doi.org/10.1007/s00038020014106

Lithuania: Country Health Profile 2023. (2023). OECD. https://doi.org/10.1787/5ed683c8-en

Lithuanian official statistics producers. (2022). *Economy and finance*.

Lund, C., Breen, A., Flisher, A. J., Kakuma, R., Corrigall, J., Joska, J. A., Swartz, L., & Patel, V. (2010). Poverty and common mental disorders in low and middle income countries: A systematic review. *Social Science & Medicine (1982), 71*(3), 517–528. https://doi.org/10.1016/j.socscimed.2010.04.027

Martin-Carrasco, M., Evans-Lacko, S., Dom, G., Christodoulou, N. G., Samochowiec, J., González-Fraile, E., Bienkowski, P., Gómez-Beneyto, M., Dos Santos, M. J. H., & Wasserman, D. (2016). EPA guidance on mental health and economic crises in Europe. *European Archives of Psychiatry and Clinical Neuroscience, 266*(2), 89–124. https://doi.org/10.1007/s00406-016-0681-x

Melluish, S. (2014). Globalization, culture and psychology. *International Review of Psychiatry, 26*(5), 538–543. https://doi.org/10.3109/09540261.2014.918873

Melzer, D., Fryers, T., & Jenkins, R. (2004). *Social inequalities and the distribution of the common mental disorders*. Psychology Press ; New York.

Milner, A., McClure, R., Sun, J., & De Leo, D. (2011). Globalisation and suicide: An empirical investigation in 35 countries over the period 1980–2006. *Health & Place, 17*(4), 996–1003. https://doi.org/10.1016/j.healthplace.2011.03.002

Moon, T. K. (1996). The expectation-maximization algorithm. *IEEE Signal Processing Magazine, 13*(6), 47–60. https://doi.org/10.1109/79.543975

Mossakowski, K. N. (2014). Stress and mental illness. *The Wiley Blackwell Encyclopedia of Health, Illness, Behavior, and Society*, 1–5. https://doi.org/10.1002/9781118410868.wbehibs358

Naz, A. (2023). Linkages between different types of globalization and socio-economic variables: Panel data analysis for 129 countries. *Journal of Economic Structures*, *12*(1). https://doi.org/10.1186/s40008-023-00301-2

Oshio, T., Nozaki, K., & Kobayashi, M. (2011). Relative Income and Happiness in Asia: Evidence from Nationwide Surveys in China, Japan, and Korea [Article]. *Social Indicators Research*, *104*(3), 351–367. https://doi.org/10.1007/s11205-010-9754-9

Patel, V., & Kleinman, A. (2003). Poverty and common mental disorders in developing countries. *PubMed*, *81*(8), 609–615.

Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior*, *29*(4), 1841–1848. https://doi.org/10.1016/j.chb.2013.02.014

Sebastiån, M. S., Mosquera, P. A., & Gustafsson, P. E. (2018). Whose income is more important: mine, yours or ours? Income inequality and mental health in northern Sweden. *European Journal of Public Health*, *28*, 1056–1061. https://api.semanticscholar.org/CorpusID:51600089

Tabash, M. I., Elsantil, Y., Hamadi, A., & Drachal, K. (2024). Globalization and income inequality in developing economies: A comprehensive analysis. *Economies*, *12*(1), 23. https://doi.org/10.3390/economies12010023

Truong, V. (2021). *The Association Between Ethnic Minority Status, Childhood Trauma and Premorbid Adjustment on Symptoms of Depression in Psychosis*. https://www.duo.uio.no/bitstream/handle/10852/90119/PSYC6100-Thesis-Vivi-Truong.pdf?sequence=1&isAllowed=y

Tugtekin, U., Barut Tugtekin, E., Kurt, A. A., & Demir, K. (2020). Associations Between Fear of Missing Out, Problematic Smartphone Use, and Social Networking Services Fatigue Among Young Adults. *Social Media + Society*, *6*(4). https://doi.org/10.1177/2056305120963760

Wolfson, M., Kaplan, G., Lynch, J., Ross, N., Backlund, E., Gravelle, H., & Wilkinson, R. G. (1999). Relation between income inequality and mortality: empirical demonstration Diminishing returns to aggregate level studies Two pathways, but how much do they diverge? *BMJ*, *319*(7215), 953–957. https://doi.org/10.1136/bmj.319.7215.953

Zhao, S., & Peng, L. (2021). Feeling matters: perceived social support moderates the relationship between personal relative deprivation and depressive symptoms. *BMC Psychiatry*, *21*(1), 345. https://doi.org/10.1186/s12888-021-03334-8