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Insights from Fuzzy Set-Theoretic Approach

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Economic Burdens, Social Protection and Well-being amidst the COVID-19 Crisis in the MENA Region: Insights from Fuzzy Set-Theoretic Approach

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Abstract

This paper aims to investigate the pathways and the possible combinations between social protection and economic hardships, contributing to explain individuals' psychological well-being during the COVID-19 pandemic in the MENA region. For this purpose, we employed the fuzzy set-theoretic approach, enabling a detailed analysis of how causal conditions contribute to an outcome. This approach is particularly suited to causal process analysis due to its configurational understanding of how causes (conditions) combine to produce outcomes. Our empirical findings confirm the presence of several paths (configurations) leading to either good or bad psychological well-being scores during the Covid-19 crisis. We observed that the absence of economic burdens is a necessary but not sufficient condition for achieving good well-being scores, as it is present in all combinations linked with the outcome but cannot produce this outcome alone. However, the results indicate that the absence of social protection combined with an age below 35 years is a sufficient but not necessary combination for producing bad well-being scores. There is clear evidence that governments and policymakers have implemented policies primarily focusing on physical well-being, with a relatively weaker emphasis on psychological well-being.

Keywords: COVID-19; Economic Burdens; Social Protection; Psychological well-being; Fuzzy Set-Theoretic Approach; MENA Region.

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1. Introduction

The Covid-19 pandemic has exerted a substantial impact on the global economy, resulting in heightened unemployment, diminished income, and increased poverty. Consequently, numerous individuals and families have grappled with economic hardships, adversely affecting their overall quality of life. In response to these challenges, governments worldwide have implemented social protection measures, encompassing initiatives such as unemployment benefits, cash transfers, and food assistance, with the aim of alleviating the pandemic's repercussion on vulnerable populations.

Gentilini et al.(2020c) underscore that approximately 195 countries globally have implemented social protection measures to address the challenges posed by the COVID-19 pandemic. As of March 31, 2021, 20 countries in the MENA region have collectively instituted 158 social protection responses to COVID-19 (Bilo, Dytz, and Sato, 2022; Krafft, Assaad, and Marouani, 2021). These measures are designed to mitigate economic hardships, with the anticipated positive outcomes extending to an improvement in the quality of life for affected families and the psychological well-being of individuals benefiting from social protection measures.

Nevertheless, the efficacy of social protection measures in mitigating the impact of the pandemic on economic hardships and overall quality of life has demonstrated variations across countries and populations.

In this research, our aim is to comprehend the effectiveness of social protection responses in mitigating the impact of the COVID-19 pandemic and economic hardships on the quality of life and well-being in MENA countries. To achieve this, we plan to explore the causal relationships between economic burdens, social protection measure, and the psychology well-being of individuals during the COVID-19 crisis in five MENA countries. This investigation employs Fuzzy Set Qualitative Comparative Analysis (fsQCA), utilizing data obtained from the ERF COVID-19 MENA Monitor Household Survey (OAMDI, 2021).

While numerous studies in the literature have delved into the impact of job loss during the COVID-19 crisis on depression or anxiety (see Mojtahedi et al., 2020; Rajkumar, 2020; Ikeda et al.,2022; Al Dhaheri et al.,2021; Nasri et al., 2023 and Shek, Leung and Tan 2023), to our knowledge, few have specifically examined the association links between social protection responses, economic hardships and the psychology well-being of individuals during the COVID-19 pandemic, particularly in the MENA region. Consequently, this paper aims to contribute to filling this research gap.

The results indicate the existence of several paths (configurations) leading to either good or bad psychological well-being scores during the Covid-19 crisis in the five grouped MENA countries. The absence of economic burdens is a deemed a necessary but not sufficient condition for achieving good well-being scores, as it is encompassed in all combinations linked with the outcome, yet incapable of producing this outcome in isolation. Furthermore, social protection emerges as neither a necessary nor sufficient condition for attaining good well-being outcomes. It can only yield a result when combined with other conditions, and that there might even be paths to an outcome that negate the impact of social protection. However, the findings reveal that a low level of education is a sufficient but not necessary condition to generating bad well-being scores, as it can produce the result on its own, yet there exist other combinations linked to this outcome. Moreover, the causal combination involving the absence of social protection combined with an age below 35 years is identified as sufficient but not necessary for generating negative well-being scores. These conditions recognized as necessary and/or sufficient, are individually tested for each country.

The structure of this paper is as follows: Section 2 presents a theoretical framework for elucidating the association between economic burdens, social protection and the well-being of individuals during the COVID-19 crisis; Section 3 outlines our data and provides a detailed

description of our empirical strategy; Section 4 discusses the main results; and Section 5 concludes the paper.

2. Literature review

The COVID-19 pandemic has dramatically altered the life of millions globally, especially in regions where movements and social contacts have been severely restricted (Al Dhaher et al., 2021). In the literature, numerous studies and academic work have underscored that beyond economic costs, the health impacts of COVID-19 extend beyond physical health, encompassing effects on the quality of life and psychological well-being of the individuals (Knolle et al., 2021; Petersen et al., 2021).

Additional research has pointed out that individuals'characteristics, behaviors, and other structural variables, such as support services, may mediate and moderate risk. For instance, Płomecka et al. (2020) explored risk and resilience factors related to the impact of COVID-19 on mental health in 12 countries and five WHO regions. The study identified female gender, pre-existing psychiatric problems, and prior exposure to trauma as notable risk factors, while factors like optimism, the ability to share concerns with family and friends, positive COVID-19 predictions, and daily exercise predicted fewer psychological symptoms (Rajkumar 2020). Furthermore, Das et al. (2021) highlighted key factors associated with poor mental health during COVID-19 in Bangladesh, including female gender, unemployment, student status, obesity and life without family. Another study from Iran emphasized the contribution of social isolation, unpredictability, uncertainty and misinformation to stress during the COVID-19 period (Zandifar and Badrfam, 2020).

A substantial body of literature has explored the impact of employment loss during the COVID-19 crisis on depression or anxiety, where studies comparing the mental health of employed and unemployed individuals. For instance, Nasri et al. (2023) demonstrated that the instability of household income resulting from job loss significantly contributed to the deterioration of

individuals' mental health in Tunisia. These findings align with prior research identifying a connection between job loss and depressive symptoms (Burgard et al., 2007 and Mojtahedi et al., 2020).

Nasri et al. (2023) also revealed that individuals age and the household size can influence mental health, and a higher level of education can enhance individuals' resilience against mental effects during the COVID-19 crisis. However, they did not consistently observe differences in mental health indicators based on sex or marital status of individuals. This result was also echoed by Sieverding et al. (2023) using data from five countries in MENA. In this study, the authors suggested that limitations in access to food were strongly negatively associated with well-being. This finding is consistent with a study from South Africa that found stronger associations between food insecurity and depressive symptoms among men than women during the pandemic (Shepherd, 2022).

On the contrary, several articles have emphasized the pivotal role of financial protection during the pandemic in containing the rapid deterioration in quality of life. Ikeda et al. (2022) demonstrated the association between job loss during the COVID-19 pandemic and health-related quality of life in the Japanese working population. They found that universal financial support during the COVID-19 era has a protective influence on an individual's quality of life. Additionally, Al Dhaheri et al. (2021) suggested that governments and policymakers should provide both moral and financial support for low-income families and those who lost their jobs. In a similar vein, Shek, Leung and Tan (2023) highlighted several missing links in social policies supporting families under the pandemic. They noted that existing policies predominantly focus on physical well-being with a relatively weaker emphasis on psychological well-being. Moreover, social policies primarily aimed at stabilizing public "financial capital", human capital (especially personal resilience), and social capital (especially family resilience) are relatively neglected.

The main contribution of our research is to address all the possible combinations between the two variables, social protection and economic burdens, providing an explanation for the quality of life of individuals. This differs from previous studies, where the association between COVID-19 and/or social protection and quality of life was examined using traditional quantitative analysis methods often based on variance, such as regressions. In regression analysis, the goal is to identify the effect a variable has on some outcome. However, in this study, the focus is on understanding the conditions that lead to a given outcome.

3. Data and Method

3.1.Data, Variables, and Descriptive statistics

In this study, we aim to investigate the causal relationships connections between economic hardship, social protection, and well-being amid the COVID-19 crisis in five MENA countries. We leverage combined data from the ERF COVID-19 MENA Monitor Household Survey (OAMDI, 2021), encompassing a sample of 10,956 individuals from Tunisia (18.25%), Egypt (18.25%), Morocco (18.32%), Jordan (23.27%), and Sudan (21.91%). The target demographic of the survey includes mobile phone users aged 18–64, with samples stratified based on country-specific market shares of mobile operators.

The comprehensive survey covers an array of dimensions, including demographic and household characteristics, education and children, labor market status, food security, income, social safety nets, employment and unemployment, attitudes toward risks, mental health, and social distancing. Additionally, it incorporates specialized modules such as a worker module focusing on occupation, job formality, impact of COVID-19 on employment, and work from home. A farmer module delves into aspects like crops, inputs, harvest, prices, markets, and more, examining the impact of COVID-19 on business and related policies.

From the survey data, we have defined three dummy variables to identify the types of economic burdens experienced by households due to the COVID-19 pandemic. These variables include:

- **DHI** (Decrease in Monthly Income): A dummy variable indicating whether the household faced a reduction in monthly income because of the COVID-19 pandemic.
- **JOL** (Job Loss): A dummy variable representing whether at least one member of the household experienced job loss during the COVID-19 crisis.
- **DFM** (Difficulties in Food Markets): A dummy variable identifying households that encountered challenges food, markets due to mobility restrictions, closures, or issues such as food shortage or price increases.

Based on these dummy variables, we have constructed an ordinal variable denoted as (ECO_Burd), representing the number of economic burdens experienced by each individual in the sample. The ordinal variable comprises four modalities.

- **ECO_Burd = 0:** indicates that the individual did not experience any economic hardship during the COVID-19 crisis.
- **ECO_Burd = 1:** represents individuals who encountered exactly one economic hardship.
- **ECO_Burd = 2:** corresponds to individuals facing two economic hardships.
- **ECO_Burd = 3:** indicates individuals experiencing all three identified economic difficulties.

In addition to economic burdens, we identified two dummy variables associated with the support received by households during the pandemic: Regular Support (RSS) and occasional support (OSS). These two variables are combined into a single variable, denoted as (Social_Prot), which signifies the number of social supports received by each individual in the sample. The Social_Prot variable comprises three categories:

- **Social_Prot = 0:** indicates that the individual did not receive any social support, either regular or occasional.
- **Social_Prot = 1:** represents individuals who benefited from one type of social support, either regular or occasional.

- **Social_Prot = 2:** indicates individuals who, in addition to receiving regular social support, also received occasional social support.

The psychology well-being of individuals (PWB) was assessed using the WHO-5items questionnaire incorporated into the survey. The WHO-5 is a brief questionnaire with five items that gauge the subjective well-being of the respondents. Derived from the General Health Questionnaire and the Psychological General Well-Being Scale, the WHO-5 items include the following statements: (1) "I have felt cheerful and in good spirits," (2) "I have felt calm and relaxed," (3) "I have felt active and vigorous," (4) "I woke up feeling fresh and rested," and (5) "My daily life has been filled with things that interest me." Respondents rate how well each of statement applies to them over the last 14 days, with scores ranging from 5 (*all of the time*) to 0 (*none of the time*). The PWB score spans from 0 to 25, where 0 indicates the lowest possible PWB, and 25 denotes the highest possible PWB. Scores are typically compared to the population mean. Individuals are then categorized into two sub-populations: those with PWB scores lower than the mean, indicating lower quality of life, and those with scores above the mean, indicating a higher quality of life.

As depicted in Figure 1, 39% of individuals in the MENA region (pooled data) reported a lower quality of life during the Covid-19 crisis, while nearly 61% reported good quality of life scores during the same period. These rates exhibit variations across the countries in the sample. Our findings indicate that the highest proportions of individuals with lower PWB scores were observed in Jordan (39.23%) and Tunisia (37.75%). Conversely, the lowest proportion was observed in Sudan (33,33%), followed by Egypt (35,85%), and Morocco (35,97%).

Figure 2 reveals that 47.75% of individuals with lower PWB scores experienced a single economic hardship during the pandemic period, while approximately 35% experienced at least two types of economic burdens. Surprisingly, 17.5% of this group reported not experiencing any of the three economic burdens considered in this research.

Similarly, we found that 26.23% of individuals with higher PWB scores did not experience economic burdens during the covid-19 crisis period. However, 73.77% of the same group reported experiencing at least one economic hardship. Therefore, the psychology well-being of individuals during the COVID-19 crisis in the MENA region appears to be influenced by other factors and conditions beyond economic burdens, such as social protection and individual characteristics (household size, educational level, and age).

In Figure 3, we present the proportions of individuals on their PWB scores and the number of social supports received during the COVID-19 crisis period. About 17.5% of individuals with low PWB scores did not benefit from any type of social support. Furthermore, over 82% of individuals with lower PWB scores did not receive any social support despite experiencing at least one economic hardship. Similarly, our findings indicate that 74% of individuals with higher PWB scores who did not receive any social support reported experiencing at least one type of economic hardship.

Figure 4 provides a separate analysis of psychological well-being and economic burdens experienced by individuals in each country, highlighting the proportions of individuals who did not receive any social support. The absence of social assistance during the crisis period appears contribute to lower PWB scores, irrespective of whether individuals experienced economic burdens. However, our estimates reveal a category of individuals with higher PWB scores despite declaring the experience of economic burdens and not receiving any social support. This proportion was calculated at 64.13%; at 80%; 79.2%; 75, 64% and 58.68%, respectively, in Egypt; Tunisia; Sudan; Morocco and in Jordan.

In Figure 5, we illustrate the proportions of individuals benefiting from at least one social support during the COVID-19 crisis based on their quality-of-life scores and the number of economic hardships. Surprisingly, we identified a category of individuals who did not report experiencing economic burdens, received social support, yet had lower psychological well-

being scores. This proportion is estimated at 20.57% in Jordan, 22.8% in Egypt, 13.52% in Morocco, 11.28% in Sudan, and 2.7% in Tunisia.

3.2. Methodology

In this research, we employ a set-theoretic approach, specifically fuzzy-set qualitative comparative analysis (fsQCA) developed by Ragin (1987). fsQCA facilitates a detailed analysis of how causal conditions contribute to an outcome, making it particularly well-suited for causal process analysis. This approach is rooted in a configurational understanding of how causes (conditions) combine to produce outcomes. It excels significant levels of causal complexity and enables the researcher to identify conditions relevant to the outcome while allowing for equifinality—different conditions leading to the same outcome.

In our study, the outcome variable is the psychology well-being (PWB) scores, while the causal conditions include economic burdens (ECO_Burd), the social protection (Social_Prot) and individual characteristics (Age, Household Size, Level of education). All variables, both outcome and conditions, are transformed into sets calibrated regarding three thresholds (full membership, full non-membership, and the crossover point[3]) in assessing whether a case is more in or out of a set (Ragin, 2008). By examining the members of the set of "Outcome", we identify combinations of conditions associated with the outcome of interest using Boolean algebra and algorithms (Quine-McCluskey). This allows the logical reduction of numerous, complex causal conditions into a reduced set of configurations that lead to the outcome.

To empirically identify these causal processes, fsQCA progresses in three steps. The first step involves establishing a data matrix known as a truth table with 2^krows, where k is the number of causal conditions (C_j). Each row of this table corresponds to a specific combination of conditions denoted as F_i, listing all possible combinations.

$$F_i = A_1^i \wedge A_2^i \wedge A_3^i \wedge \ldots \wedge A_k^i.$$

[3] The point of maximum ambiguity or fuzziness.

Where ∧ represents the logical AND operator, implemented using minimum operation, and $A_j^i = C_j \; or \sim C_j$(Complement of C_j); where $j = 1 \ldots \ldots k$ and $i = 1 \ldots \ldots 2^k$.

In the second step, the number of rows in the truth table is reduced based on two conditions: (1) the minimum number of cases required for a solution to be considered, denoted as the "frequency threshold (f)", whose the available cases, and (2) the minimum consistency level of a solution. Ragin (2008) suggests that this consistency level should typically be above 0.8, but not less than 0.7. The outcome of the second step is smaller subset of "actual" causal combinations.

From this subset of actual causal combinations, fsQCA provides three types of configurations: Complex output presents all possible configurations, parsimonious outputs calculate only the essential configurations, and intermediate output stands between these two.

To enhance our understanding of the causal conditions contributing to individuals' psychological well-being, we will separately test the conditions identified as necessary and/or sufficient for each country included in our analysis. The definitions of these conditions are as follows:

- *Necessary and sufficient condition for the outcome*: when a condition can produce the outcome by itself.
- *Necessary but not sufficient condition:* When a condition is present in all combinations linked with the outcome, but it cannot produce this outcome alone.
- *Sufficient but not necessary condition*: when a condition is capable of producing the outcome on its own, but there are also other combinations linked to the outcome.
- *Neither Necessary nor sufficient condition*: when a condition cannot produce the outcome alone and must be combined with other conditions. Additionally, there might be paths to the outcome that contain the negation of the condition.

By separately testing these conditions for each country, we aim to gain insights into the specific combinations of factors that significantly contribute to the psychological well-being of individuals in each context.

4. Results and Discussion

In our analysis, we adopt the notation for solution tables introduced by Ragin and Fiss (2008), whereby black circles ("●") indicate the presence of a condition, circles with a cross ("x") indicate the absence of a condition, and blank spaces represent an "indifferent" situation where the causal condition may be either present or absent.

The solution table exclusively include configurations that consistently led to the outcome of interest, which, in this case, pertains to good or bad psychological well-being outcomes. Configurations that do not result in the desired psychological well-being outcomes, do not meet the frequency threshold, or lack a consistent pattern (thus failing the consistency threshold) are not included in the solution table. The use of this notation allows for a clear representation of the identified configurations associated with the outcome variable.

4.1.Paths for Achieving Good Psychology Well-Being

The solution table reveals four solutions derived from the fuzzy set analysis, all exhibiting acceptable consistency levels (> 0.80). Additionally, it indicates the presence of several overall solutions, suggesting a situation of first-order, or across-type, equifinality of solutions. Moreover, the neutral permutations within solutions S1 (S1a and S1b) and S2 (S2a and S2b) further point to the existence of second-order, or within-type, equifinality.

Table 2: Configurations for Achieving Good psychology well-being scores in MENA region during covid-19 crisis

Assumptions: frequency cutoff: 12 and consistency cutoff >0.8

Paths (configurations)		ECO_ Burd	Social_ Prot	Edu_ ind	Age_ ind	Size _hh	Row Coverage	Consistency
~ECO_Burd*~Social_Prot*~Edu_ind* Size_HH	P1a	⊗	⊗	⊗		●	0.260	0.886
~ECO_Burd*~Social_Prot*Age_ind* Size_HH	P1b	⊗	⊗		●	●	0.316	0.887
~ECO_Burd*Social_Prot*Edu_ind*Age_ind*~Size_HH	P2a	⊗	●	●	●	⊗	0.179	0.913
~ECO_Burd*Social_Prot*Edu_ind*~Age_ind*Size_HH	P2b	⊗	●	●	⊗	●	0.189	0.904

Solution coverage: 0.421983
Solution consistency: 0.865078

Source: Author calculations using fsQCA software

The two identified paths, P1a and P1b, suggest that achieving a good psychology well-being score during the Covid-19 crisis in MENA region is possible under specific conditions:

Path P1a: the absence of economic burdens, combined with the absence of social protection and living with a large family, is sufficient for achieving a good psychological well-being score. Additionally, in this path, there is trade-off between the individual's age and their level of education. Specifically, when there is no economic burden, the individual's age becomes less relevant if their educational level is not high, as indicated by the blank space for education level signifying an "indifferent" situation.

Path P1b: similar to P1a, the absence of economic burdens, combined with the absence of social protection and living with a large family, is also sufficient for achieving a good psychological well-being score. In this path, here is a trade-off between age and education level, but with a different pattern. Here, being over 35 allows for good psychological well-being scores regardless of the individual's educational level, as indicated by the blank space for education level, suggesting an "indifferent" situation.

Comparing paths P1a and P1b reveals that being older than 35 and having a low level of education can be treated as substitutes in achieving well-being scores. This suggests that, in certain conditions, either being older with a lower level of education or being younger with a higher level of education can lead to positive outcomes for psychological well-being. Notably, these findings underscore the explanatory power of QCA in elucidating relationships internal to configurations, including substitution and complementarity effects, which are often opaque in more standard statistical approaches.

Moving on to configurations P2a and P2b, they represent a second important path toward achieving good psychological well-being scores. Both paths involve the absence of economic hardship, a high level of education, and the presence of social protection. However, the P2b differs from the P2a in that it combines being over 35 years old with living in a family composed of fewer than 5 members as conditions for having good psychological well-being.

Table 2 includes coverage scores, providing insight into the percentage of cases following each identified path. The combined models, in terms of overall coverage, account for approximately 42 percent of membership in the outcome. This assessment allows for the evaluation of the relative importance of different causal paths in explaining variations in psychological well-being.

Furthermore, the models in Table 2 suggest the existence of one possible necessary condition shared across all paths—the absence of economic burdens. However, given that the configurations do not cover all potential paths to achieving good psychological well-being scores, and considering the presence of other configurations that may lead to positive outcomes but did not meet the consistency and frequency thresholds, the results indicate the presence of several sufficient solutions but likely no necessary condition for achieving good psychological well-being scores in this context.

Analyzing each country separately (Table A1 in the Appendix), the results highlight the contribution of the absence of economic burdens in achieving good psychological well-being scores. Notably, in Tunisia, the absence of economic burdens is identified a necessary and sufficient causal condition for good well-being scores during the COVID-19 period. Additionally, the absence of economic burden combined with the absence of social protection constitutes a necessary but not sufficient causal configuration for good individual well-being scores in three countries: Tunisia, Egypt and Morocco. In Sudan, a high educational level is identified as necessary and sufficient causal condition for good well-being scores, a condition also observed in Tunisia. The absence of economic burdens and having social protection are identified as two sufficient but not necessary conditions for good psychological well-being scores in Jordan. These country-specific findings further illustrate the context-dependent nature of the factors influencing psychological well-being.

4.2.Paths for Achieving Bad Psychology Well-Being

The FsQCA analysis of bad psychology well-being scores reveals no consistently identifiable intermediate solution. When combined with the results of good well-being, this outcome suggests a clear picture of asymmetric causality in FsQCA. To elucidate the causal conditions contributing to individual's bad well-being scores, we present in Table 3 two solutions derived from the MQ algorithm—Complex and Parsimonious. The results indicate the existence of three distinct configurational groupings, pointing to the presence of first-order equifinality in both types of solutions.

Table 3: Configurations for Achieving bad psychology well-being scores in MENA region during covid-19 crisis

CONFIGURATIONS (Paths) frequency cutoff: 12 Consistency cutoff >=0.75	**Complex Solution**						**Parsimonious Solution**			
	P1	**P2**		**P3**			**P1**	**P2**		**P3**
		a	**b**	**a**	**b**	**c**		**a**	**b**	
ECO_Burd				●	●	●				●
Social_Prot	⊗	●	●	⊗		●		●	●	
Age	⊗	●	⊗	●	●	●		●		●
Edu_ ind		●	●		⊗		⊗			
Size_Hh		⊗	●	●	⊗	⊗			●	●
Consistency	0.614	0.741	0.745	0.730	0.746	0.751	0.573	0.703	0.700	0.725
Raw coverage	0.485	0.252	0.262	0.388	0.344	0.270	0.521	0.304	0.325	0.400
Overall solution consistency	0.591801						0.562176			
Overall solution coverage	0.66666						0.689549			

Source: Author calculations using fsQCA software

From the complex solution, Configuration P1 suggests that the absence of social protection for a young individual (aged less than 35 years old) can explain the bad psychological well-being scores during the COVID-19 period in the MENA region. Configurations P2a and P2b indicate the presence of second-order equifinality, combining the presence of social protection and a high educational level with age and household size to explain the poor psychological well-being of individuals, regardless of whether they have experienced economic burdens or not. Specifically, path P2b suggests that being young and living in a large family leads to poor psychology well-being scores. In contrast, path P2a presents the opposite pattern: being old and living in a small family can explain the poor quality of life during the period of COVID-19.

Contrary to P1 and P2 (P2a and P2b), Configuration P3 indicates that the presence of economic burdens and being over 35 years old contribute to the poor psychological well-being of individuals in the MENA region during the COVID-19 crisis. In addition to these two causal conditions, and unlike P3c, path P3a suggests that the absence of social protection and living in

a large family lead to poor psychological well-being scores. However, P3b differs from these two paths (P3a and P3c) and suggests that having a low educational level, being old, and having experienced economic hardship during the crisis period are causal conditions of poor psychological well-being, whether the individual is a beneficiary of social protection or not.

The parsimonious solution reveals three possible paths leading to poor psychological well-being scores during the COVID-19 crisis in the MENA region, suggesting the presence of first-order equifinality. Configuration P1 emphasizes only to the individual's educational level, indicating that having a low educational level can lead to poor psychological well-being regardless of whether economic hardship and social protection are present or not.

Paths P2a and P2b indicate the existence of second-order equifinality, showing clear trade-offs, with age and household size substituting for each other and allowing for neutral permutations around the core condition (the presence of social protection). In contrast, configuration P3 combines the presence of economic burdens with age and household size to explain poor psychological well-being scores of individuals, regardless of whether they have benefited from social protection or not.

From the parsimonious solution, a low education level is sufficient but not necessary condition, as it is capable of producing poor psychological well-being scores on its own, but there are other combinations linked to this outcome. Similarly, the causal combination (absence of social protection combined with age under 35) is sufficient but not necessary for achieving poor psychological well-being scores (from the complex solution).

On the other hand, the absence of social protection combined with a high educational level, being over 35 years old , and living in a large family constitutes a necessary and sufficient causal combination for having poor well-being scores in Morocco (see Table A2 in the Appendix). In the same vein, two necessary but not sufficient conditions are identified in Tunisia and Egypt. These two countries share a low educational level as a necessary condition

for having poor well-being scores. Furthermore, the presence of economic burdens is a necessary condition for achieving poor scores in Tunisia, while in Egypt, the absence of social protection constitutes a necessary condition for achieving the same outcome.

Our results also show that social protection is neither a necessary nor a sufficient condition for the outcome of poor psychological well-being scores in Tunisia. In Sudan, all causal conditions are neither necessary nor sufficient for poor well-being scores. However, the absence of protection combined with a low educational level constitutes a sufficient but not necessarily causal combination in Jordan for having poor psychological well-being scores, given that this combination can produce the outcome on its own, but at the same time, there are other combination also linked to poor well-being scores.

5. Conclusion

In this study, we examined the causal relationships between social protection and economic burdens, seeking to elucidate the psychological well-being of individuals during the COVID-19 pandemic in the MENA region. To accomplish this, we employed the fuzzy set-theoretic approach, grounded in a configurational understanding of how various causes (conditions) interact to produce specific outcomes.

A key and noteworthy finding highlighted in this study is the observed association between economic burdens during the COVID-19 pandemic and the well-being of certain individuals within our sample. Furthermore, we noted that the financial support received during the COVID-19 era exerted a protective influence on the well-being of individuals facing economic challenges. Despite this protective factor, however, the quality of life for specific individuals declined, even though they did not encounter economic hardships during the Covid-19 crisis and were beneficiaries of social security coverage.

The second noteworthy finding pertains to the identification of various paths (configurations) leading to favorable psychological well-being scores. We established that the absence of

economic burdens is a necessary condition for attaining a good psychological well-being score during the Covid-19 crisis in MENA region (aggregated data). This finding held true for three specific countries: Tunisia, Egypt and Morocco. Additionally, we discerned that a high level of education serves as a necessary and sufficient causal condition for achieving positive well-being scores in Sudan. In the case of Jordan, we identified two conditions that are sufficient but not necessary for obtaining good psychological well-being scores, namely the absence of economic burdens and the presence of social protection.

The third key finding concerns the paths leading to unfavorable psychological well-being. Our results indicate that the absence of social protection, being young and living in a large family, being old and having experienced economic hardship, and possessing a low level of education can collectively explain the negative psychological well-being scores during the COVID-19 period in the MENA region.

The fourth result highlights that causal conditions and combinations identified as necessary and sufficient for unfavorable well-being outcomes vary across countries. In Tunisia, both a low educational level and the presence of economic burdens are identified as two necessary conditions to explain poor well-being scores. Conversely, in Morocco, the necessary and sufficient causal combination for unfavorable well-being scores consists of the absence of social protection coupled with a high level of education, being over 35 years old, and living in a large family . Additionally, in Jordan, we found that the absence of protection combined with a low educational level constitutes a sufficient but not necessarily causal combination for experiencing negative psychological well-being scores. In Egypt, the results indicate that the absence of social protection is a necessary condition for achieving the same outcome.

In this research, there is clear evidence that governments and policymakers in the MENA region have implemented policies primarily concentrating on physical well-being, with a relatively limited emphasis on psychological well-being. Additionally, social responses have

predominantly targeted the stabilization of public "financial capital", human capital (especially personal resilience), and social capital (particularly family resilience), which are comparatively overlooked. This observation underscores the importance of considering psychological aspects in policy formulation, especially during future emergency situations. This research provides valuable insights for policymakers aiming to establish effective strategies in response to future crises.

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Figures

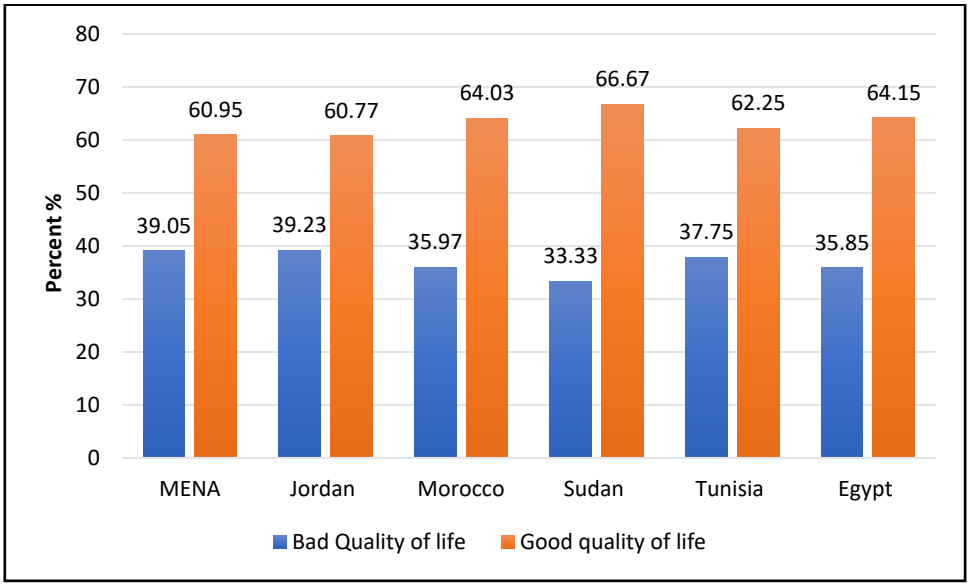

Figure 1: Comparison of PWB scores between Five MENA countries

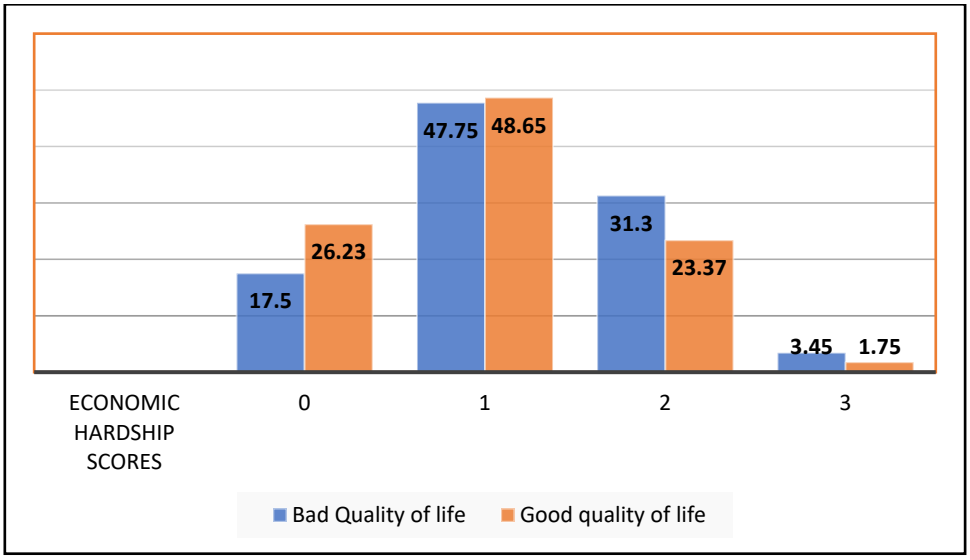

Figure 2: Quality of life according Economic Burdens Scores in MENA region during Covid-19 Crisis.

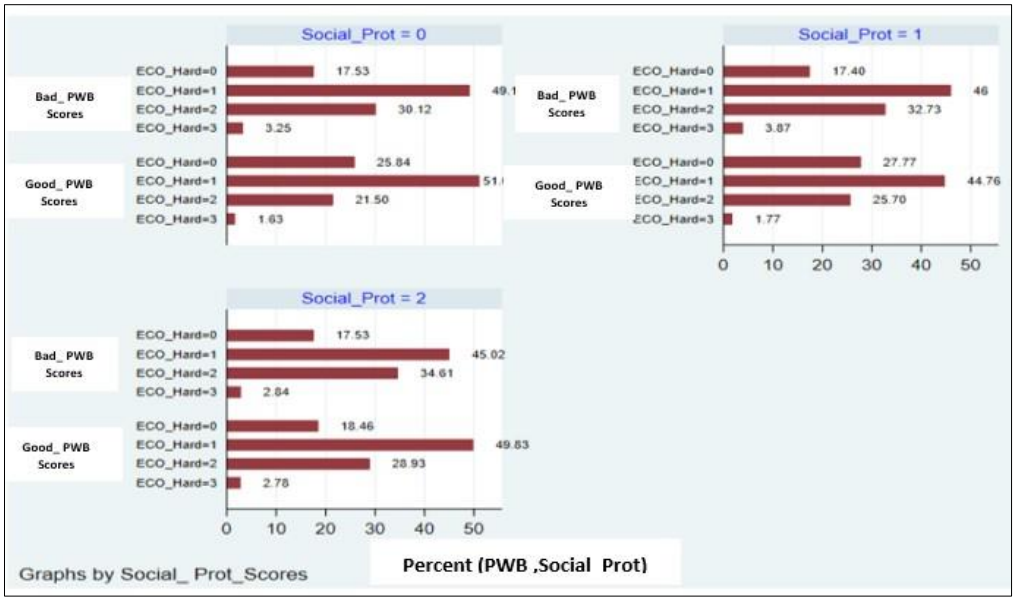

Figure 3: Psychological well-being scores (PWB) and the number of social supports received during the COVID-19 period

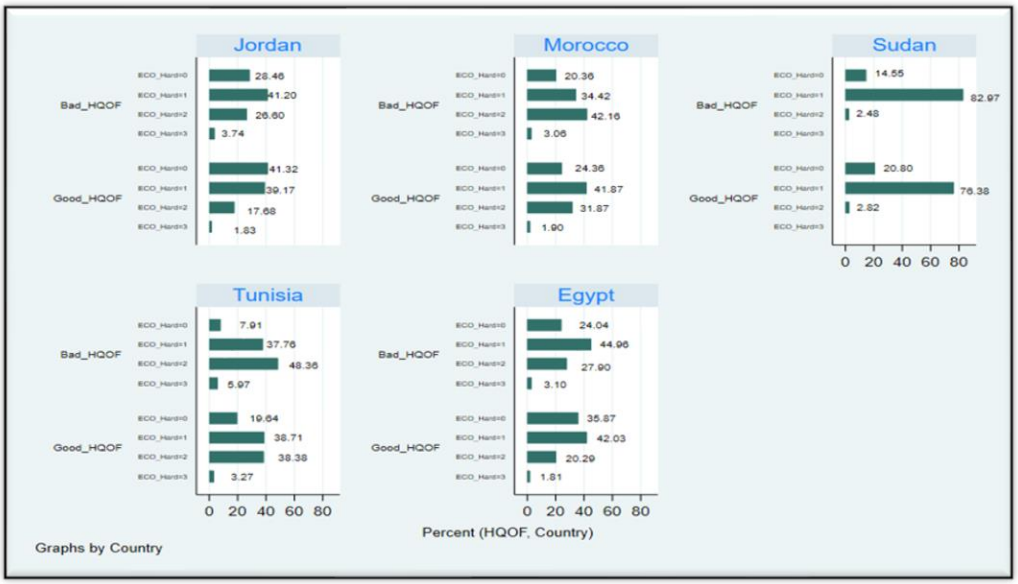

Figure 4: Quality of life and economic Hardships by country (Social_Prot=0)

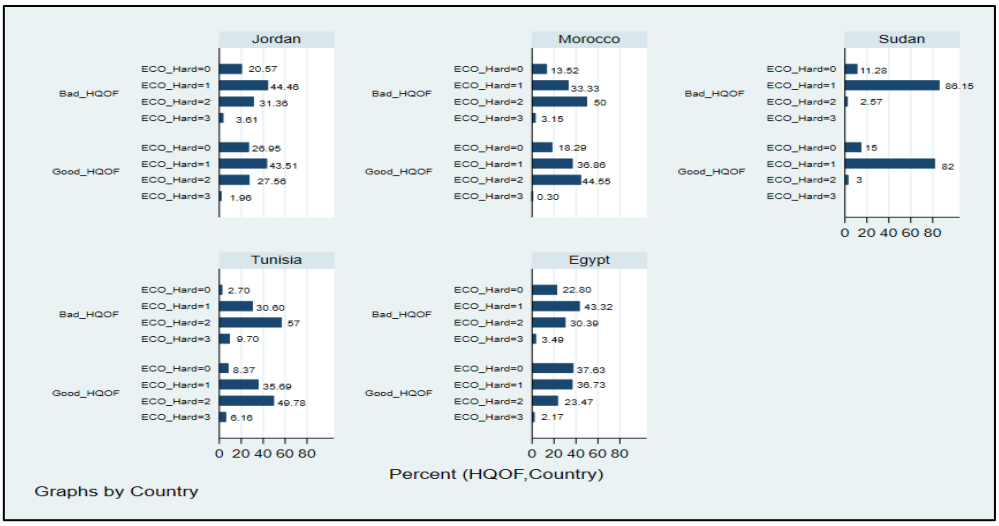

Figure 5: Quality of life and economic Hardships by country (Social_Prot >=1)

Tables

Table 1: Outcome variable, causal conditions and membership thresholds

Countries		MENA (Pooled data)	Tunisia	Egypt	Morocco	Sudan	Jordan
PWBScores	Max	25	25	25	25	25	25
	Mean	17.06627	16.921	18.442	16.63976	17.70167	15.83837
	Min	0	0	0	0	0	0
ECO_Burd	Max	3	3	3	3	2	3
	Mean	1	1	1	1	1	1
	Min	0	0	0	0	0	0
SocialProt	Max	2	2	2	2	2	2
	Mean	1	1	1	1	1	1
	Min	0	0	0	0	0	0
hhsize	Max	54	36	19	54	35	14
	Mean	5.261135	4.509	4.7865	4.936721	6.45625	5.353864
	Min	1	1	1	1	1	1
Education	Max	4	4	4	4	4	4
	Mean	2	2	2	2	2	2
	Min	1	1	1	1	1	1
age	Max	64	64	64	64	64	64
	Mean	35.25411	39.152	35.0545	36.17987	30.47958	36.11887
	Min	18	18	18	18	18	18

Appendix

Table A1: Conditions (combinations) For Achieving Good Well- being scores by country

Tunisia	Assumptions: frequency cutoff: 7 and consistency cutoff: 0.912353						
Paths	ECO_Hard	Social_Prot	Edu_ ind	Age_ ind	Size_hh	Row Coverage	Consistency
~ECO_Hard*~Social_Prot*Edu_ind*~Size_Hh	⊗	⊗	●		⊗	0.396425	0.896706
~ECO_Hard*~Social_Prot*Edu_ind*~Age_ind	⊗	⊗	●	⊗		0.347804	0.907949
solution coverage: 0.404059 solution consistency: 0.890623							
~ECO_Hard♠	⊗					0.554563	0.835588
solution coverage: 0.554563 solution consistency: 0.835588							
Sudan	Assumptions: frequency cutoff: 9 and consistency cutoff: 0.809483						
Paths	ECO_Hard	Social_Prot	Edu_ ind	Age_ ind	Size_hh	Row Coverage	Consistency
~Social_Prot*Edu_ind*~Age_ind		⊗	●	⊗		0.519818	0.770233
~ECO_Hard*Edu_ind*~Age_ind	⊗		●	⊗		0.52159	0.792386
~ECO_Hard*~Social_Prot*~Size_Hh*Edu_ind	⊗	⊗	●		⊗	0.506859	0.806828
solution coverage: 0.638154 solution consistency: 0.76504							
Morocco	frequency cutoff: 8 and consistency cutoff: 0.850154						
Paths	ECO_Hard	Social_Prot	Edu_ ind	Age_ ind	Size_hh	Row Coverage	Consistency
~ECO_Hard*~Social_Prot*~Edu_ind	⊗	⊗	⊗			0.399853	0.835052
~ECO_Hard*~Social_Prot*Age_ind	⊗	⊗		●		0.386936	0.842641
~ECO_Hard*~Social_Prot*Size_Hh	⊗	⊗			●	0.384871	0.854439
~Social_Prot*Age_ind*Size_Hh		⊗		●	●	0.362096	0.841278
solution coverage: 0.563207 solution consistency: 0.80604							
Egypt	frequency cutoff: 10 and consistency cutoff: 0.901995						
Paths	ECO_Hard	Social_Prot	Edu_ ind	Age_ ind	Size_hh	Row Coverage	Consistency
~ECO_Hard*~Social_Prot*EDU_ind	⊗	⊗	●			0.545421	0.838388
~ECO_Hard*~Social_Prot*Size_Hh	⊗	⊗			●	0.449719	0.883248
solution coverage: 0.602771 solution consistency: 0.8312							
~ECO_Hard*EDU_ind♠	⊗		●			0.586796	0.823456
~ECO_Hard*Size_Hh ♠	⊗				●	0.46687	0.882354
solution coverage: 0.645571 solution consistency: 0.817922							
Jordan	frequency cutoff: 8 and consistency cutoff: 0.851181						
Paths	ECO_Hard	Social_Prot	Edu_ ind	Age_ ind	Size_hh	Row Coverage	Consistency
~ECO_Hard*~Social_Prot	⊗	⊗				0.648777	0.754845
~Social_Prot*~Edu_ind*~Age_ind		⊗	⊗	⊗		0.302578	0.811341
ECO_Hard*Social_Prot*Edu_ind*~Age_ind*~Size_ind	●	●	●	⊗	⊗	0.157409	0.891325
solution coverage: 0.702597 solution consistency: 0.743402							
~ECO_Hard♠	⊗					0.686235	0.735837
Social_Prot♠		●				0.25348	0.809543
~Edu_ind*~Age_ind♠			⊗	⊗		0.307393	0.804866

solution coverage: 0.750628 solution consistency: 0.71869

♠ PARSIMONIOUS SOLUTION
Source: Author calculations using fsQCA software

Table A2: Conditions (combinations) For Achieving Bad Well-Being Scores by Country

Tunisia	Assumptions: frequency cutoff: 7 and consistency cutoff: 0.800617						
Paths	ECO_Hard	Social_Prot	Edu_ ind	Age_ ind	Size_hh	Row Coverage	Consistency
ECO_Hard*~Social_Prot*~Edu_ind*Size_Hh	●	⊗	⊗		●	0.39178	0.777884
ECO_Hard*Social_Prot*~Edu_ind*Age_ind	●	●	⊗	●		0.314242	0.792914
solution coverage: 0.441967 solution consistency: 0.760902							
~Edu_ind*Size_Hh♠			⊗		●	0.433172	0.760973
Social_Prot*Age_ind		●		●		0.440867	0.690275
solution coverage: 0.677532 solution consistency: 0.64938							
Sudan	Assumptions: frequency cutoff: 4; consistency cutoff: 0.714576						
Paths	ECO_Hard	Social_Prot	Edu_ ind	Age_ ind	Size_hh	Row Coverage	Consistency
~ECO_Hard*~Social_Prot*Size_Hh* ~Edu_ind*~Age_ind	⊗	⊗	⊗	⊗	●	0.271799	0.746856
~ECO_Hard*~Social_Prot*~Size_Hh* ~Edu_ind*Age_ind	⊗	⊗	⊗	●	⊗	0.25364	0.717321
ECO_Hard*Social_Prot*Size_Hh*Edu_ind* ~Age_ind	●	●	●	⊗	●	0.316022	0.714576
solution coverage: 0.436929 solution consistency: 0.643314							
Morocco	frequency cutoff: 8 and consistency cutoff: 0.779403						
Paths	ECO_Hard	Social_Prot	Edu_ ind	Age_ ind	Size_hh	Row Coverage	Consistency
~Social_Prot*Edu_ind*Age_ind*Size_Hh		⊗	●	●	●	0.275759	0.752757
solution coverage: 0.275759 solution consistency: 0.752757							
Edu_ind*Age_ind*Size_Hh♠			●	●	●	0.27874	0.752485
solution coverage: 0.27874 solution consistency: 0.752485							
Egypt	frequency cutoff: 10 and consistency cutoff: 0.80213						
Paths	ECO_Hard	Social_Prot	Edu_ ind	Age_ ind	Size_hh	Row Coverage	Consistency
ECO_Hard*~Social_Prot*~Edu_ind	●	⊗	⊗			0.395163	0.737601
~Social_Prot*~Edu_ind*Size_Hh		⊗	⊗		●	0.424556	0.7587
solution coverage: 0.47063 solution consistency: 0.721045							
ECO_Hard*~Edu_ind♠	●		⊗			0.408488	0.725842
~Edu_ind*Size_Hh♠			⊗		●	0.436644	0.755846
solution coverage: 0.486831 solution consistency: 0.710632							
Jordan	frequency cutoff: 8 and consistency cutoff: 0.821074						
Paths	ECO_Hard	Social_Prot	Edu_ ind	Age_ ind	Size_hh	Row Coverage	Consistency
~Social_Prot*~Edu_ind		⊗	⊗			0.487889	0.704311
ECO_Hard*Social_Prot*Edu_ind*~Age_ind	●	●	●	⊗	⊗	0.196348	0.821074

*~Size_ind							
solution coverage: 0.532802 solution consistency: 0.692256							

♠ PARSIMONIOUS SOLUTION

Source: Author calculations using fsQCA software