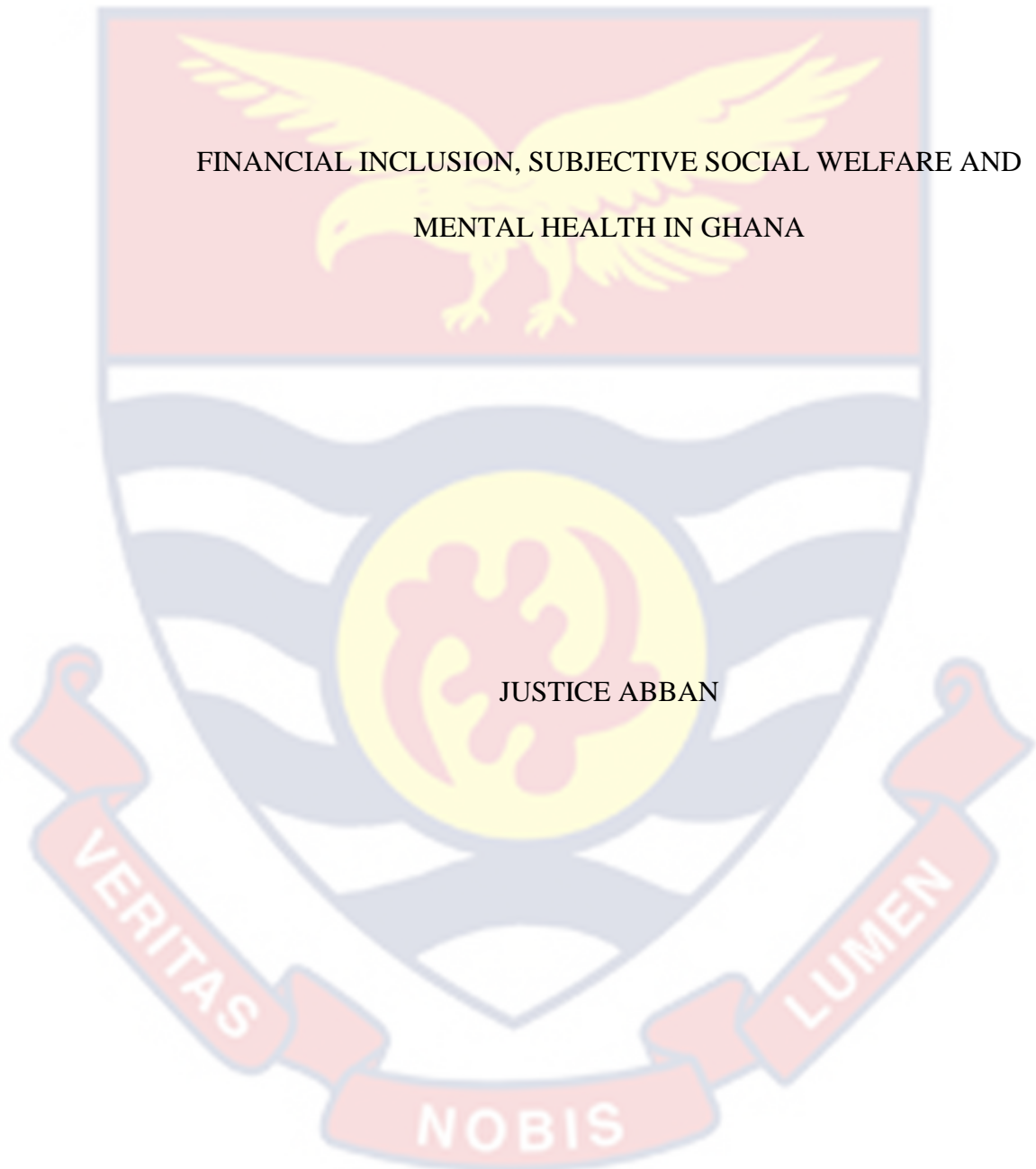UNIVERSITY OF CAPE COAST

FINANCIAL INCLUSION, SUBJECTIVE SOCIAL WELFARE AND

MENTAL HEALTH IN GHANA

JUSTICE ABBAN

2023

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University of Cape Coast

UNIVERSITY OF CAPE COAST

FINANCIAL INCLUSION, SUBJECTIVE SOCIAL WELFARE AND

MENTAL HEALTH

BY

JUSTICE ABBAN

Thesis submitted to the Department of Economic Studies of the School of

Economics, College of Humanities and Legal Studies, University of Cape

Coast, in partial fulfillment of the requirements for the award of Master of

Philosophy degree in Economics

OCTOBER 2023

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature ……………………… Date …………………………..

Name: …………………………………………………………………..

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature………….. …….. Date ……………………

Name: ………………………………………………………………….

Co-Supervisor's Signature……………................Date ……………………

Name: ……………………………………………………………………

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ABSTRACT

This paper examines the effect of financial inclusion on mental health and subjective social welfare in Ghana. It also makes the first attempt to examine how subjective social welfare influences the relationship between financial inclusion and mental health. Data from the Ghana Socio-economic Panel Survey was utilized. Mental health was proxied by depression. The study utilized the Fixed Effect Model for the baseline specification and the IV method to solve issues of endogeneity. The results show that financial inclusion significantly reduces depression by approximately 1.86 points. Additionally, there is an improvement in individuals' subjective social welfare, reflecting increases of 2.21 and 1.27 points at the community and national levels, respectively. Using the Structural Equation Model for mediation analysis, we reveal that subjective social welfare at the community level partially mediates the financial inclusion-depression nexus. The results of this study support mounting evidence that inclusive finance reduces the symptoms of depression and increases subjective social welfare, aligning with the Sustainable Development Goal (SDG) 3, which aims to promote mental health and well-being.

KEY WORDS

Mental Health

Depression

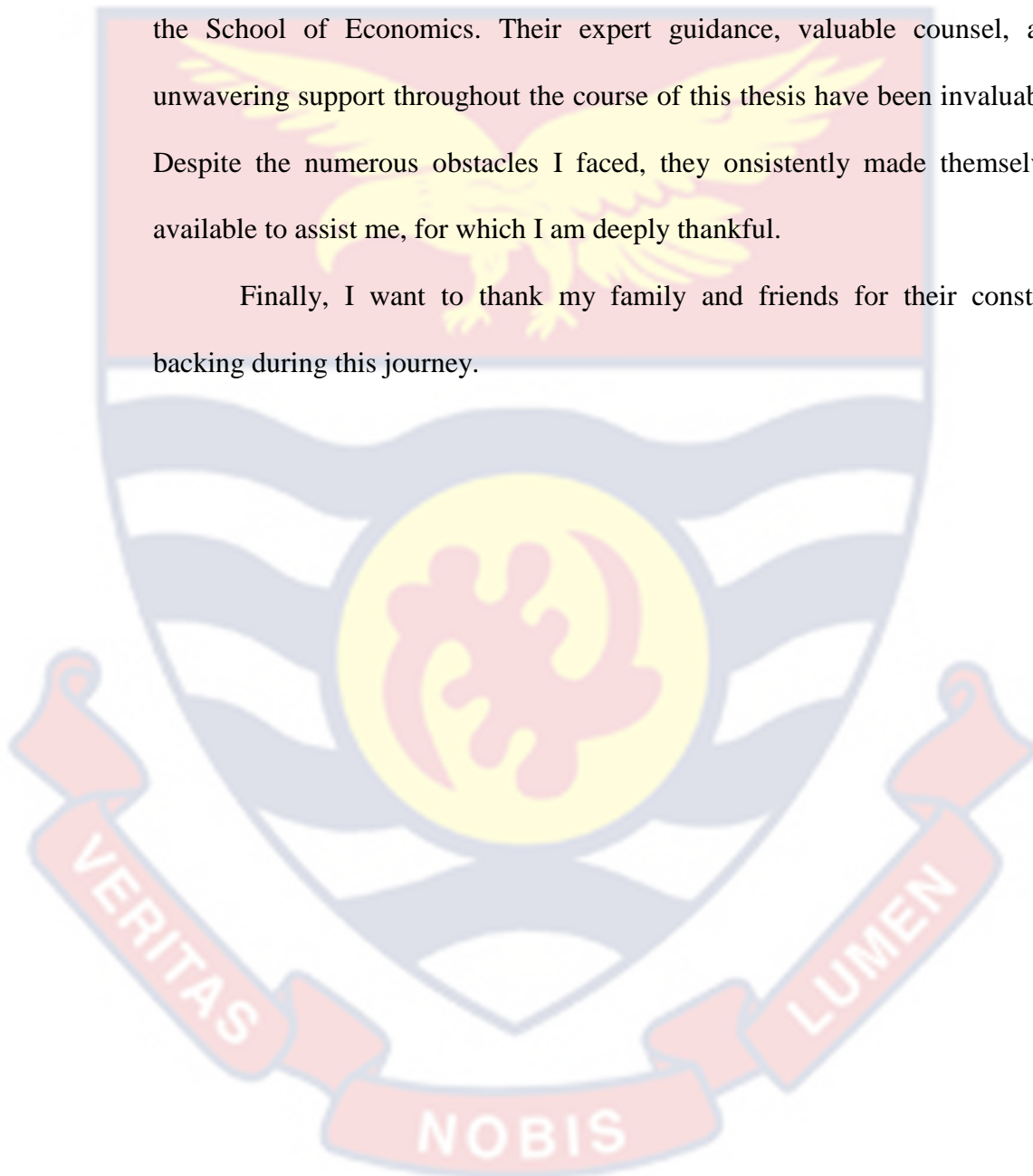Financial inclusion

Subjective social welfare

Financial Institutions

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Finally, I want to thank my family and friends for their constant backing during this journey.

DEDICATION

To my brother, Enoch Abban

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LIST OF ABBREVIATION

FI	Financial Inclusion
GSPS	Ghana Socioeconomic Panel Survey
HHS	Household Size
LEAP	Livelihood Empowerment against Poverty
MFI	Microfinance Institution
OLS	Ordinary Least Square
PCA	Principal Component Analysis
SDG	Sustainable Development Goals
SEM	Structural Equation Model
SSW	Subjective Social Welfare
SSW_ Community	Subjective Social Welfare at the Community level
SSW_Ghana	Subjective Social Welfare in relation to Ghana
WHO	World Health Organization
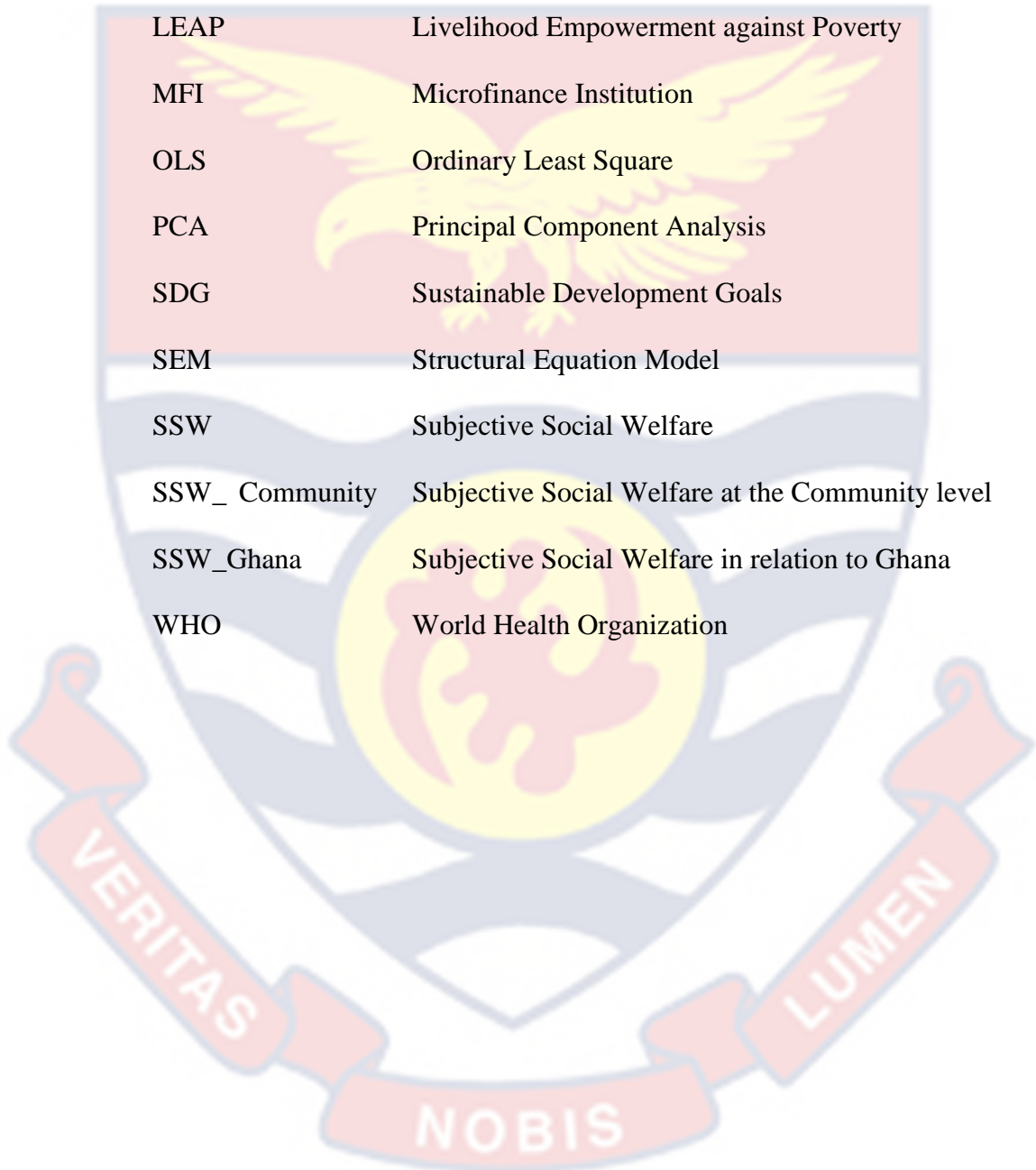
CHAPTER ONE

INTRODUCTION

This chapter provides a comprehensive overview of the study. It includes the background to the study, the problem statement, the purpose for which the study was conducted, the objectives, research questions, the study's significance, delimitation and limitations, as well as how the study was organized. This section aims to give the reader an understanding of what the research is about, its objectives, and why it is significant especially in contemporary times.

Background to the Study

Up until recently, researchers tended to concentrate on mental health issues and their impact on subjective social welfare outcomes, whereas historically, mental health has frequently been overlooked as a component of individual welfare and development policies, with a focus on physical health and economic development. However, one cannot reject the fact that a happy and fulfilling life leads to having good mental health, which is an essential part of health in general. Report from the WHO in 2022 on mental health depicts that our general state of health and well-being are tied to posessing a stable mental health, which is a basic human right. Our ability to establish connections, perform effectively, manage stress and thrive is significantly enhanced when our mental health is strong.

Several studies have helped to increase recognition of the enormous impact of mental illness on socio-economic development, including its detrimental repercussions, such as productivity losses (Bubonya *et al*., 2017) and greater usage of resources for treatment. According to Takizawa, (2012),

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mental diseases are among the leading causes of bad quality of life, disability, and death. They also account for a large percentage of lost years of life adjusted for disability, which increases the overall global disease burden (Collins *et al.,* 2011). This indicates that the impact of mental illness extends beyond individual suffering and has far-reaching implications for public health and overall well-being. Understanding the profound socio-economic implications of mental illness underscores the urgent need for effective interventions and mental health policies.

One of the main mental health conditions that unquestionably lowers one's level of life satisfaction and overall health is depression. The WHO predicts that by 2030, depression is anticipated to emerge as the leading cause of mental illness. Report in 2023 also reveals that depression affects about 280 million people worldwide, making depression the most common mental disorder globally (WHO, 2023). Also, a staggering 5% of adults (4% of men and 6% of women) and 5.7% of people over 60 are believed to suffer from depression, which affects approximately 3.8 percent of the overall population (Abbafati et al., 2020; WHO, 2022). Given these revelations, we can say that depression has had a notable impact on the global disease burden. Mental health disorders, especially depression, greatly contribute to disability and alienation, making it very cumbersome for people to participate fully in their communities and the economy. They have previously been ignored in majority of Africa because of structural and other obstacles like inadequate and outdated health infrastructure and financial constraints even at the household level.

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Mental health condition also takes the demographic (gender, location, age, marital status and others) dimension. Within the United States of America, approximately 6.5 million individuals, constituting one-fifth of the rural populace, grapple with mental disorders. This figure corresponds to roughly one-fifth of the entire rural population (Morales *et al*., 2020). In China, a study by Li, *et al.,* (2009) found that rural-to-urban migrants had worse mental health status than both urban residents in the communities they are migrating to and their rural counterparts in the communities they are leaving. Several research have revealed that women have high chances of experiencing mental illness than men (Somers *et al.,* 2006; SáenzHerrero, 2015). Men are more likely than women to encounter mental health problems connected to substance addiction, but anxiety or depression issues are more likely to affect women, depending on the kind of condition (Cabezas-Rodrguez *et al.,* 2021).

Within Ghana, certain demographic groups display a higher prevalence of major depressive disorder. Depression is more prevalent among females (3.14%) which constitutes about half a million of the total population than males (1.94%) about 286,126 of the total population (WHO, 2022). According to Appiah-Kubi (2023), depression is more prevalent in the rural settings compared to the urban settings. This could be attributed to various factors, including limited access to mental health services, social and economic disparities, and the influence of cultural and traditional norms. Given these findings, it becomes evident that putting mental health first is crucial for maintaining overall health and well-being. Mental health is intricately linked to physical health, and neglecting one's mental well-being can have significant

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consequences on an individual's overall quality of life (National Research Council and Institute of Medicine, 2009).

Since the early 2000s the United Nations has prioritize the necessity to lessen people's burdens associated with their mental health and welfare of the economies of the world as a whole. It is by this reason that in 2015, the UN set developmental objectives intended to secure global and individual prosperity (UNSGSA et al., 2018). These are the 17 Sustainable Development Goals (SDGs). They take a wide range of aspects into account, including the environment, good health, bridging inequality gap, and education. Seven out of the 17 SDGs (which includes SDG 1,2,3,4,5,7 and 12) have been identified as being achievable through financial inclusion, hence policy initiatives must be put in place to guarantee this is the case in African nations (Klapper et al., 2016). This study however will focus on the third SDG which emphasizes on good health and improved well-being.

Financial inclusion has been viewed as a critical component of achieving the Sustainable Development Goals (SDGs) of the United Nations, notably those connected to eradicating poverty, promoting gender equality, ensuring individual wellbeing, and fostering economic growth. Using and having access to formal financial services can help people meet their basic needs, such as health care, while also easing their financial strain and enhancing their general well-being. Furthermore, financial inclusion has an association with improved mental health outcomes, such as reduced depressive symptoms, stress and anxiety, increased life satisfaction, and enhanced well-being (Kahneman & Deaton, 2010; World Bank, 2018). The ability to save, access credit, and engage in financial transactions allows individuals to better

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manage their financial resources, make future plans, and cope with unexpected expenses. This sense of financial security and control contributes to a greater sense of stability and contentment in individuals' lives.

The concept of financial inclusion emerged in response to the growing recognition of the barriers faced by underprivileged households in accessing financial services. Particularly in the early 2000s, there was increasing concern about the exclusion of marginalized populations from formal financial systems. These populations, often comprising low-income individuals and families, often lacks the availability of essential financial services. After the global economic crisis 2008, the evolution of financial inclusion has proven to dramatically raise individual standard of living and lessen issues relating to mental health like depression, stress and the like around the world. Despite the fact that there is no solitary definition for financial inclusion that is accepted across board in literature (Sanderson, Mutandwa, & Le Roux, 2018), it can be encapsulated as the accessibility of affordable financial services, such as, savings, transaction, loan access, and insurance, to both individuals as well as enterprises (Sahay *et al.,* 2015).

The World Bank defines financial inclusion as the use of formal financial services made available to both individuals and businesses that were previously not part of the financial system (World Bank, 2018). Determining the link between financial inclusion, subjective social welfare and mental health difficulties especially depression can thus help policymakers create programs and policies that will encourage financial inclusion and enhance individual subjective social welfare. Financial inclusion is believed to have made it possible for people to fully engage in economic activity by having

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access to money, improve their businesses, engage in educational opportunities, reduce risk, and manage any unforeseen financial shocks which positively affects their mental health.

In addition, evidence shows that financial inclusion may lead to a more beneficial effects on several aspects of welfare, including education, health (Aguila, 2016; Ajefu *et al.,* 2020), gender equality (Aterido *et al.,* 2013; Kaur *et al.,* 2020; Kofman *et al.,* 2020). At the same time, increasing numbers of people are becoming aware of the value of financial inclusion in fostering economic growth and eradicating poverty (Saha & Qin, 2023). A study by Raza *et al.,* (2019) in Pakistan found that strengthening the establishment of bank accounts as well as extending financial access can boost economic growth. That is, by involving all economic agents in the financial system, the government may reduce poverty by focusing on financial inclusion measures. In several developing or growing economies, almost 80% of the populace has access to a financial account, which has boosted human growth (Klapper *et al.,* 2016). Some of these economies include China, India, Kenya and many more.

Other studies examining the connections between finance and poverty report ambiguous findings, including those by Jeanneney and Kpodar (2008) and Beck *et al.,* (2007). Several authorities' declaration of inclusive finance as a policy goal is rooted in financial-economic growth (Levine, 2005; Sulong & Bakar, 2018) and poverty alleviation (Churchill, & Marisetty, 2020). Despite a number of articles suggesting that financial inclusion reduces poverty, a large number of articles provides conflicting results on the association between finance, growth, and poverty reduction (Abosedra, Shahbaz, & Nawaz, 2016;

Duvendack *et al.,* 2011). Also, other studies have explored the connection between financial inclusion and subjective social welfare (Akay *et al*., 2014; Merkle *et al*., 2015; Ozili, 2020; Xu, & Sun, 2022; Appiah-Kubi, 2023).

Subjective social welfare measures a person's opinion of where they stand in society in comparison to others (Adler & Kwon, 2002; Appiah-Kubi, 2023). It differs from objective measures of social welfare including income, education, and employment. It is frequently used to gauge the individual's cognitive evaluation about his or her life in relation to the society they live. According to a study by Wu *et al*. (2023), mobile payments have a beneficial influence on subjective social welfare. This effect is especially noticeable in socially vulnerable groups including the elderly, those with lower incomes, and those with less education. Another study by Chen *et al.,* (2020) demonstrated that keeping risk-free assets in the financial market has a beneficial impact on subjective welfare, whereas holding risky assets is proven to have a negative impact. Financial inclusion, which gives people access to financial services that create financial stability, empower people, and promote social inclusion, has been associated with better social outcomes (Ozili, 2020; Appiah-Kubi, 2023).

Despite the potential benefits of financial inclusion on welfare outcomes, a significant proportion of the population worldwide remains financially excluded. This problem is particularly acute in developing countries, where a lack of financial infrastructure, limited access to financial services, and low levels or lack of financial literacy are the fundamental impediment to financial inclusion. Over 2.5 billion adults worldwide roughly half of all adults do not have a bank account (World Bank, 2014). While it

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may seem that some individuals choose not to have bank accounts, the majority are actually denied access due to various obstacles such as high costs, long travel distances to financial service providers, and burdensome paperwork requirements. These factors, as highlighted by the World Bank (2014) and Cámara and Tuesta (2014), contribute to the exclusion of individuals from formal financial systems.

In developing countries, financial exclusion is a major challenge, with over 1.7 billion adults still unbanked, and many more underbanked (World Bank, 2018). Most researchers assert that people who feel excluded or ostracized may have lower subjective social status. Furthermore, a study by Lazzarino *et al.* (2013) found that individuals who were financially distressed were more likely to develop mental health issues like depression. More households utilizing financial services, according to El-Zoghbi, Holle, and Soursourian (2019), is a necessary but insufficient precondition for increased subjective social welfare. It was also observed that significant portion of those who are financially excluded have low incomes and are unable to access formal financial services, mostly because of poverty (Global Findex Database 2017).

According to recent papers, such those by Aslan et al. (2017) and Kara et al. (2021), suggest that the disparity in access to financial services may have an impact on how effective financial inclusion is as a policy instrument.. Individuals hailing from marginalized backgrounds are less likely to use financial services than average, a trend that extends to women (Botric & Broz, 2017; Peprah, 2012; Swamy, 2014), individuals of color (Omran, 2018), people with impairments (Okonji & Ogwezzy, 2018) and immigrants

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(Albareto & Mistrulli, 2010). For instance, in countries like Chad, Cameroon, Niger, and Gabon, certain regulations exist that hinder females from holding an account under the same condition as males (Kofman, & Payne, 2020; World Bank 2018).

In the instance of Ghana, the country has made significant effort to increase financial inclusion though few barriers exist. According to the Consultative Group to Assist the Poor's (CGAP) Financial Inclusion Insights Survey, access to formal financial services increased significantly in Ghana between 2010 and 2015, rising from 41% to 58 % of the population, although access to these services is still unavailable to 42% of the population. The National Financial Inclusion and Development Strategy (NFIDS), which was established in order to focus on relatively excluded groups and increase access to formal financial services from 58 to 85 percent of the adult population by 2023, has helped to realize this vision. It was discovered that 96 percent of Ghana's adult population has access to financial services, exceeding the target of 85 percent for 2023 according to the 2021 Financial Services Demand-Side Survey Report.

Most of these vulnerable groups who are financially excluded lacks the financial literacy and education needed to access these financial services. As per findings from the 2021 Global Findex Report, approximately two-thirds of adults who do not have a bank account mentioned that if they were to open one at a financial institution (excluding mobile money), they would require assistance to use it effectively. The report also indicated that women five percent more likely than men to seek assistance in utilizing their mobile money accounts. A novice account user who asks a family member or a

banking employee for assistance in utilising their account may find themselves at a higher risk of becoming a victim of financial exploitation especially in the absence of these helpers. Furthermore, within developing economies, one out of every five adults receiving wage payments into their accounts encountered unforeseen charges during the transaction process. Collectively, these concerns highlight the increased susceptibility of less experienced financial clients to fraudulent activities (Global Findex report 2021; Sebu *et al.,* 2023).

However, individuals with a respectable amount of knowledge on how to manage their finances, such as participation in a microfinance credit union, how to send and receive money using banking institution's digital platform, and availability of credit through both banking and nonbanking channels, may be linked to a reduced mental health issue. These findings were reported in studies by Krause and Bastida (2011), Agrigoroaei *et al*., (2017), Mensah and Dzokoto (2011) and Aguila *et al.* (2016). There is the need for improvement in numeracy and literacy skills when it comes to financial dealings, designing products with consideration for how customers typically use them and their abilities, and finally robust consumer protections that are necessary to guarantee that customers derive crucial benefits from financial access hence improvement in subjective welfare outcomes and mental health.

Besides, studies on financial inclusion and subjective social welfare are one area where social capital has proven to be particularly important. Some studies suggest that social capital can be a key factor in advancing financial inclusion (Bongomin *et al.,* 2016; Khaki & Sangmi, 2016). Increased financial inclusion via transactions using mobile money, may depend on the caliber of social networks they have, according to Bongomin *et al*. (2018). This suggests

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the potential for social capital, that is, collective action, bonding, trust, and bridging in matters concerning financial inclusion. Those who face obstacles to financial inclusion, such as a lack of financial literacy or access to conventional financial institutions, can benefit from the information and resources available through social networks. Furthermore, social support networks can act as a safe haven for people and households experiencing financial challenges, lowering the likelihood of mental health issues.

Statement of Problem

The establishment of the National Mental Policy, the Mental Health Authority Strategic Plan (2019–2022) and other mental health related initiatives alonside the relatively limited support in terms of funding from the Government of Ghana indicate a modest level of dedication for mental health services (Mental Health Authority 2018; World Health Organization, 2022). In fact, the budget for general health includes 2.97% for mental health (WHO, 2021). Estimates indicate that the government invests 0.639 USD per person yearly in mental health (Abbafati *et al.,* 2020). To assist the general public's wellbeing, there has been the provision of social intervention initiatives such as National Health Insurance, Livelihood Empowerment Against Poverty (LEAP), school capitation grants, and feeding programs (WHO, 2022).

However, despite all of these government attempts and interventions, mental health problems, particularly depression, is still on the rise. In fact, Ghana still has a major depressive disorder prevalence that is greater than the global average (that is, 2.56% vs. 2.49%) (Abbafati *et al.,* 2020; WHO, 2022). Studies have proven that financial inclusion brings about improved social outcomes. However, in the Ghanaian context, it has received less attention in

controlling this issue (mental health related issues). It is in this regard that this paper aims to explore the effect of financial inclusion on subjective social welfare and mental health in the Ghanaian context.

Also, there is a large gap in the body of knowledge regarding how financial inclusion, subjective social welfare, and mental health are related especially in the Ghanaian context. Although studies on the general connection between financial inclusion and mental health have been undertaken in various parts of the world, to the best of our knowledge, there has been little study explicitly focused on Ghana. This gap in knowledge presents a critical challenge for policy-makers, mental health practitioners, and other stakeholders who need evidence-based insights to develop effective strategies to improve mental health outcomes and individual wellbeing in the country. Therefore this study is crucial to understanding the factors that contribute to mental health outcomes in the country. Hence, this study will provide valuable insights into the challenges faced by underserved populations and help to develop effective interventions to improve mental health outcomes.

Additionally, the use of cross-sectional data by previous studies makes it challenging to analyze relationships between variables due to the lack of extensive, multi-level, and long-term scientific data that tracks individuals through time (Aguila et al., 2016; Ajefu et al., 2020; Appiah-Kubi 2023). To improve analytical rigour, this study utilizes longitudinal data, offering the capacity to repeatedly track changes over time to produce unbiased results. Furthermore, with depression being the most prevalent mental health disorder in Ghana, affecting around two million Ghanaians (Nakua, *et al*., 2023), this

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study sheds light on a crucial aspect of mental health that needs attention and intervention. It serves as a compelling call to action for policymakers.

Among the various studies exploring the correlation between mental health and financial inclusion, none has specifically examined the role of subjective social welfare as a mediator in this connection. This research contributes uniquely to the existing literature by being the first to delve into the impact of financial inclusion on mental health through the lens of subjective social welfare. Previous studies have highlighted the influence of financial inclusion on mental health (Aguila et al., 2016; Ajefu et al., 2020) and subjective social welfare (Appiah-Kubi, 2023).

Purpose of the Study

The purpose of this study is to explore the effect of financial inclusion on subjective social welfare as well as mental health.

Research Objectives

1. To assess the effect of financial inclusion on mental health

2. To examine the effect of financial inclusion on subjective social welfare.

3. To explore how subjective social welfare mediates the effect of financial inclusion on mental health.

4. To assess how the effect of financial inclusion on mental health differs across demographic groups, such as marital status, gender and locality.

5. To examine how the effect of financial inclusion on subjective social welfare varies across different demographic groups such as marital status, gender and locality.

Research Questions

1. What is the effect of financial inclusion on mental health?

2. What is the effect of financial inclusion on subjective social welfare?

3. Can subjective social welfare mediate the effect of financial inclusion on mental health?

4. How does the effect of financial inclusion on mental health vary across demographic groups, such as marital status, gender and locality?

5. Does the effect of financial inclusion on subjective social welfare differ among various demographic groups, including marital status, gender and locality?

Research Hypothesis

This study will seek to test these hypotheses;

1. H_o: Financial inclusion has no effect on mental health.

   H_A: Financial inclusion has a significant effect on mental health.

2. H_o: Financial inclusion has no effect on subjective social welfare.

   H_A: Financial inclusion has a significant effect on subjective social welfare.

3. H_o: Subjective social welfare does not mediate the relationship between financial inclusion and mental health.

   H_A: Subjective social welfare mediates the relationship between financial inclusion and mental health.

4. H_o: The effect of financial inclusion on mental health does not differ across demographic groups, such as marital status, gender and locality.

   H_A: The effect of financial inclusion on mental health differs across demographic groups, such as marital status, gender and locality.

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5. H_o: The effect of financial inclusion on subjective social welfare does not vary across different demographic groups such as marital status, gender and locality.

H_A: The effect of financial inclusion on subjective social welfare varies across different demographic groups such as marital status, gender and locality.

Significance of the Study

Financial inclusion, in particular, has been linked to improved welfare outcomes and reduced depressive symptoms, resulting in significant mental health benefits, and it has been the focus of extensive research in recent years. However, there is still much to learn and the study is important for several reasons. First, it can help in achieving the Sustainable Development Goal 3 which seeks to ensure healthy lives and promote well-being for all individuals at all ages. Specifically, target 3.4 which aims at reducing by one third premature mortalities through the promotion of mental health and well-being by 2030.

Moreover, the study can have significant policy impacts for policymakers and organizations working to promote financial inclusion and improve mental health outcomes as well as subjective social welfare of individuals. By understanding the relationship between these factors, policymakers and organizations can design more effective policies and programs to address social and economic disparities as well as inequalities with regards to access and usage of financial services so that individual subjective welfare can be enhanced. The study's possible ramifications are important for a variety of stakeholders, including policymakers, institutions

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involved in the financial sector to increase access to and usage of financial services especially to the vulnerable and marginalized group in society

Delimitation of the Study

One delimitation was the selection of a specific population for the study. Individuals who participated in the Ghana Socioeconomic Panel Survey (GSPS) wave 1 to wave 3 was used. While the survey may not capture the experiences and perspectives of other populations, it provided a large sample of individuals that can be used to explore the relationship between financial inclusion, subjective social welfare and mental health in a specific context and over time. Another delimitation of the study was the geographic location of the study. The study was conducted in a region, Ghana to be precise, and the findings may not be generalizable to other regions. However, this delimitation was made to ensure that the study was conducted in a specific context with unique socio-economic characteristics that may influence the relationship between financial inclusion, subjective social welfare and mental health.

Limitation of the Study

This study was limited by a number of factors. One major limitation of the study was the limited access to all available indicators to measure the variables. Financial inclusion, subjective social welfare and mental health were complex and multifaceted concepts that cannot be adequately captured by a single indicator. Due to the limited access to all available indicators, this study may not be able to capture the full extent of the relationship between the variables involved. This may result in an incomplete understanding of the complex interplay between these variables. Additionally, the use of limited indicators may also result in a bias towards certain aspects of the variables and

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may overlook important nuances and variations within them. To overcome this limitation, the study used the most relevant and validated indicators available to ensure the validity and reliability of the findings.

It is essential to also acknowledge the limitation arising from the absence of certain important variables within the available database. While exploring the relationships between financial inclusion, subjective social welfare, and mental health, the unavailability of additional variables such as health status of respondent, ethnicity and the likes, that could serve as potential covariates may limit the depth of our analysis. It is worth noting that the inclusion of these missing variables could have provided a more comprehensive understanding of the complex dynamics under investigation. This limitation highlights the need for future research endeavors to incorporate a broader array of factors, thereby contributing to a more nuanced comprehension of the phenomena at hand. Despite these limitations, we believe this study will contribute to the growing body of literature on the subject and as well provide valuable insights into the complex relationship between these variables.

Organization of the Study

There were five chapters in the study. An overview of the study was presented in the first chapter. The second chapter reviewed the existing literature on the subject matter as well as the theoretical review. The third chapter described the data and methods used in the study, including the measures of financial inclusion, subjective social welfare and mental health as well as the statistical methods used to analyze the data. The fourth chapter presented and discussed the results of the study, including the relationship

between financial inclusion, subjective social welfare and mental health. The chapter also highlighted whether the several demographic factors differs with regards to the relationship identified. Finally, the fifth chapter provided a conclusion and discussion of the implications of the study for policymakers as well as recommendations.

CHAPTER TWO

LITERATURE REVIEW

The critical assessment of earlier studies on financial inclusion, subjective social welfare and mental health is presented in this chapter. This section presents the conceptual framework, empirical, theoretical and conceptual review that guides this study. The empirical review gives an empirical analysis of prior studies linked to the study objectives. The primary theories supporting the study are discussed in the theoretical review section. The study's pertinent concepts are examined in the conceptual review and the conceptual framework shows the representation of the relationship we expect among the study's variables.

Theoretical and Conceptual Review

The association between financial inclusion, subjective social welfare, and mental health can be understood through several theoretical frameworks. The fundamental theories that underpin this study will be reviewed in this section.

Subjective Social Welfare

An individual's view of their position in society relative to others is measured by subjective social welfare (Adler & Kwon, 2002; Appiah-Kubi, 2023). It includes introspective assessments of interpersonal interactions, civic engagement, sense of belonging, and overall well-being. Subjective social status is viewed as a more thorough indicator of one's social standing than more prevalent objective measurements and is typically found to be much more associated with health markers especially mental health. The MacArthur Scale of Subjective Social Status measures a person's perceived position

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within a community in relation to others based on their educational attainment, financial standing, and social background (Adler, et al., 2000; Singh-Manoux et al., 2005; Cundiff et al., 2013). A 10-rung ladder diagram is used to symbolize the scale; each rung shows an individual's position within the community or the nation in general, with the highest rung signifying the highest-placed persons and the lowest rung signifying the lowest-placed individuals.

Subjective social welfare describes how people see their own level of welfare, fulfilment, and general quality of life in relation to others. Several researches on subjective social welfare reveals that low socioeconomic status is mostly associated with numerous health outcomes and biological risk factors for disease (Euteneuer, 2014; Tang *et al.,* 2016). The factors influencing subjective social welfare differ among individuals. For instance, Kim and Lee (2021) discovered that people in Chinese communities who have numerous social connections with people in high-status occupations tend to consider their own subjective social status as being greater. A higher subjective social standing is also associated with having dependable family and friends in Taiwan and Korea (Kim & Lee, 2021). These findings highlight the role of social capital in shaping individuals' self-perceptions. Furthermore, several studies indicate that the availability and accessibility of financial services are also associated with higher subjective social status (Ozili, 2020; Appiah-Kubi, 2023).

The Bottom Up Theory of Subjective Social Wellbeing

The bottom up theory of subjective social wellbeing is another approach that relates to individual subjective social welfare. This perspective

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advocates that external circumstances do matter when it comes to assessing individual's subjective social welfare (Nsenkyire et al., 2024). The concept of bottom-up interrelation implies that the contentment derived from individual aspects of life influences overall life satisfaction. In other words, the satisfaction experienced in specific life domains contributes significantly to the overall sense of well-being. This interconnected relationship highlights the importance of considering and understanding various facets of life when assessing one's overall satisfaction and happiness.

Supporting the bottom-up theory, studies indicate that there is a correlation between poverty and a decrease in subjective social welfare. Additionally, specific adverse life events, as highlighted by Diener et al. (2009), can have a lasting impact on an individual's happiness. This indirectly suggests that promoting financial inclusion may play a role in influencing subjective social welfare, underscoring the complex interplay between economic factors, life events, and overall well-being.

Financial Inclusion

Researchers have significantly aided in the understanding of the reasons for and effects of the widespread exclusion of people from financial services, especially in developing nations. People's exclusion from financial services has detrimental economic and social effects on nations as a whole. As a result, financial inclusion has elevated to the top of the political agenda in a number of nations around the world. Governments develop social innovation initiatives and policies to open doors for those shut out of the financial system (Thoene, & Turriago-Hoyos, 2017). From the perspective of creating a conceptual framework and figuring out the underlying causes of low levels of

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access to the financial system, defining financial inclusion is important (Kumar, 2017). There is no universal definition of financial inclusion, according to an assessment of the literature, however, it has been defined in a variety of ways in the economics and finance literature. For instance, Sarma (2012) offered a thorough definition that encompasses crucial aspects affecting a wide population, like accessibility, availability, and use of financial services.

A significant percentage of the population needs to have easier access to formal financial services if economic growth is to be sustained. High rates of investment, employment, high income, and low poverty rates are usually linked to high levels of financial inclusion (Ibrahim, & Olasunkanmi, 2019). On the individual level, financial inclusion, according to studies, can improve people's subjective social welfare by giving them a sense of agency, stability, and dignity and by boosting their social capital, social mobility, and social standing (Sachs *et al.*, 2018). The drive for financial inclusivity in Africa has achieved notable progress, particularly in the Eastern part of Africa, thanks to the introduction of mobile money systems (Demirguc-Kunt *et al.,* 2013; Adonu, 2020). However, according to Demirguc-Kunt and Klapper (2012b), only around 25% of adults have bank accounts in sub-Saharan Africa. This serves as a call for action for most policy makers and government in developing countries.

Capability Approach

The capability approach theory suggests that development should be assessed based on one's ability to lead lives they value. It highlights the importance of ensuring that individuals have access to and control over a

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range of financial services and resources. Financial inclusion is not just about providing access to bank accounts or credit; it also entails enabling individuals to make choices and pursue goals that are meaningful to them.

According to the utilitarian proponents like John Stuart Mill and Jeremy Bentham, a choice is deemed "good" under utilitarianism if it enhances a person's pleasure and satisfies their chosen interests (Eggleston, 2012; Hausman & McPherson, 2006). Bentham campaigned for changes in the law that would make majority of the people as happy as possible, in contrast to Mill, who thought that human individuality and personal liberty are essential for achieving individual well-being. Utilitarianism, as advocated by Bentham and Mill, aims to create a society that maximizes overall happiness by promoting actions that produce the greatest amount of pleasure and minimize pain.

Amartya Sen in 1992 and Martha Nussbaum in 2001 made further advancements to their work which brought about the theory of the capability approach. Sen's capability approach is a conceptual framework that emphasizes the value of human capabilities in fostering personal growth and welfare (Sen, 1999). It can be seen as an extensive traditional framework for analyzing and appraising societal structures and individual welfare, as well as crafting policies and offering recommendations for societal change (Wells, 2012). Put differently, the concept emphasizes the notion that the aim of development should be directed to expanding individual's capacities and opportunities, rather than simply increasing their income or consumption levels.

According to Sen, a person's capabilities and functionings define how well-off they are. The fundamental tenet of the theory is the willingness to conceptualize individual welfare in terms of capabilities and functionings. An individual's "doings and beings," or numerous human conditions and behaviours, such as being educated, having a healthy diet, getting married, and travelling, are examples of their "functionings," while their "capabilities" are the actual, or significant, opportunities that they have to accomplish these doings and beings. Capabilities are those personal traits as well as the political, social, and economic context that upholds individual freedom when opposed to functionings, where here, the term "functionings" refers to how human experiences are affected by capabilities. (Kuriakose & Iyer, 2015). Financial resources will be the primary input for some of these capabilities.

In the context of this study, Sen's capability approach offers an insightful lens through which one can view the connection between financial inclusion, subjective social welfare and mental health. From the capabilities standpoint, financial inclusion entails enabling people to pursue their goals and lead satisfying lives in addition to giving them access to financial resources. For instance, having access to finance can help people launch a business or invest in their education, both of which can boost their income and subjective social welfare (Kabeer, 2012). Financial inclusion also gives people the freedom to decide how to use their resources, which can increase their feeling of dignity and autonomy. Thus, according to the perspective, being well-off involves more than just having money or material possessions; it also includes having the capacity to live a life that is fulfilling (Robeyns, 2011).

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The relevance of basic capabilities, such as having access to social security, financial services, healthcare, and education, is one manner in which the capability approach links to subjective social welfare. This does not mean that having access to social security, financial services, healthcare, and education encompasses subjective social welfare but these qualities can lead to higher levels of subjective social welfare and are necessary for people to enhance their mental health. For instance, research has demonstrated that social security programs can reduce poverty and enhance social welfare and that access to healthcare can improve physical and mental health results (Midgley, 2009). Thus, capability approach can direct policies and initiatives that advance subjective social welfare by emphasizing the significance of basic capabilities, in this case, accessibility of financial resource.

Mental Health

An area that has been ignored for far too long has now come out of the shadows because to the increased attention that mental health has received over the past decade, both domestically and internationally. Global luminaries in politics, athletics, entertainment, and academics have taken a stance in recent years to demonstrate their commitment to correcting this neglect and frequently to tell their own tales of pain, adversity, and recovery. In fact, the inclusion of mental health in the Sustainable Development Goals highlights how important mental health has become in recent years for accomplishing international development objectives.

In Sub-Saharan Africa (SSA), depression is a prevalent mental illness that frequently goes misdiagnosed and underreported. The quality of life and psychosocial functioning of persons who are impacted by mood disorders,

such as major depression, are known to be drastically reduced (Gbadamosi *et al*., 2022). The African continent accounts for 10% of the world's burden of mental illnesses (5.4% for depression and 3.2% for anxiety, respectively) (Depression and Other Common Mental Disorders Global Health Estimates, 2017). There are two million Ghanaians who have mental illnesses like depression (Nakua, *et al*., 2023).

Approximately 13% of the world's population is thought to be at risk of developing a diagnosable mental health illness at some point in their lives, as depicted by the World Health Organisation (WHO), yet most of them do not receive sufficient treatment. The estimated yearly global expense is approximately US$2.5 trillion, but only a small fraction of this funding is allocated to tackling the origins and consequences of the issue. Depression is a frequent mental health problem that is characterised by persistent sorrow and a loss of interest in activities that one generally finds enjoyable (Nakua, *et al*., 2023). Depression and anxiety, two of the most prevalent mental health issues, are said to cost the world economy $1 trillion every year, according to a Lancelet world Health report on mental health matters 2020. This necessitates a multidisciplinary approach to the problem of mental health disorders that addresses both the financial and the socioeconomic components.

On finance, studies has demonstrated that increased financial inclusion can result in better mental health outcomes (Aguila *et al*., 2016; Gyasi *et al.,* 2019; Ajefu *et al.,* 2020). These studies collectively demonstrate that financial inclusion can lead to better mental health outcomes by lowering financial stress, enhancing people's sense of security and self-worth, and enhancing their welfare as a whole. It is crucial to remember that the mechanism through

which financial inclusion affects mental health outcomes can be multifaceted and complex. To better understand the exact processes and underlying pathways by which financial inclusion affects mental health outcomes in various circumstances, more research is required.

Health Capital Theory

Financial inclusion ensures that individuals have access to various financial services, including savings, credit, insurance, and payment mechanisms. This access is crucial for financing healthcare expenses. Without adequate financial services, individuals may struggle to afford essential medical care, leading to poorer health outcomes. This aligns with the core idea of health capital theory. The underlying principles of the health capital theory was laid by the groundbreaking works of Schultz (1961), Becker (1964) and Ben-Porath (1967). However, despite their contributions to education, their publications had a number of health-related flaws. Becker (1964), for instance, noted that investing in health capital should decline with age since the time span over which profits can be accumulated shortens. However, even after retiring, when health becomes less crucial for earning income, it is evident that health investments continue to rise as individual's age. The health-capital paradigm was developed by Michael Grossman in 1972, considering the differences between health and other forms of human capital by the earlier proponents (Galama, & Van Kippersluis, 2013).

Michael Grossman's Health Capital Theory is a seminal framework that has greatly improved our comprehension of the connection between health and individual behavior. The theory underlines the idea that people might think of their health as a type of capital stock and that they invest in their

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health in order to increase their general well-being and productivity (Grossman, 1972). These investments may involve the use of healthcare, preventive measures, and the adoption of healthy lifestyles. By making health-related investments, people hope to increase not only their physical well-being but also their human capital and economic productivity (Grossman, 1972).

According to Grossman, people spend money and time on their health to reap the consumption benefits as well as the production benefits. Consumption benefits in the sense that excellent health gives utility and by production benefit we mean healthy people work to generate more money. The model offers a conceptual framework for analyzing the demand for health and medical care in connection to a person's resource limitations, preferences, and consumption requirements over the course of their lifetime (Galama, 2015). The theory draws attention to how decisions made by individuals and other external factors affect their health. Additionally, it acknowledges that investments in health capital can result in better life quality and lower healthcare expenditures.

In the context of this research, Grossman's Health Capital Theory offers a helpful lens for comprehending how financial inclusion can affect the individual's subjective social welfare and health outcomes. Financial inclusion can encourage people to use financial services like banking, credit, and insurance to invest in their health capital. For instance, increased access to financial services can make it possible for people to pay for routine medical treatment, buy health insurance, and lead healthier lifestyles (Gyasi et al., 2019). These services according to Grossman is considered an investment in health. These investments in health capital are similar to investments in other

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forms of capital, such as education or financial assets. By investing in their health, individuals aim to improve their overall quality of life and enhance their productivity. Their overall social welfare as well as their mental health may benefit as a result.

Financial stress is undoubtedly a common trigger for depression, particularly in low-income households where it may be difficult to make ends meet and where unpredictable income swings may occur (Guan *et al.,* 2022). By opening up access to credit, insurance, and savings accounts, financial inclusion may enable people and households to better manage their money, respond to emergencies, and make long-term plans improving their subjective social welfare and reducing their depressive symptoms. Financial inclusion can also give people a sense of financial security, lowering the financial pressures that often exacerbate mental health problems.

Empirical Review

In this section, we give a review of the literature that focuses on the associations and connections between three major themes: financial inclusion and mental health proxied by depression in this study, subjective social welfare and mental health and financial inclusion and subjective social welfare.

Financial Inclusion and Mental Health

Financial inclusion has been designated as a significant policy target for many nations throughout the world, as it is seen as an important means of promoting individual well-being and reducing mental health issues. However, the evidence base is still thin in the majority of developing nations, including Ghana, despite the numerous studies that have looked at this association.

For instance, study by Aguila, Angrisani and Blanco (2016) employed owning a bank account to investigate the effect of financial inclusion on health among older Hispanics in the USA. The Hispanic individuals were aged between fifty-one and ninety. These old aged individuals finds it very difficult to access basic financial services because of their cultural background or their inability to fully assimilate to the culture or customs of the society in which they live. Their study employed the panel data analysis to look at the relationship between bank account ownership and health among older Hispanics. Their results revealed that having a bank account is associated with better mental health among the older Hispanics but not physical health. However, their methodology was merely a rudimentary attempt to identify a causal relationship and did not delve deeper.

Consistent with the initial study by Aguila et al., (2016), Gyasi, Adam, and Phillips (2019) also looked into the relationship between financial inclusion, healthcare-seeking conduct, and health status among elderly individuals in Ghana. The study first employed a multivariate logistic regression that looked at how financial inclusion affected outcomes for psychological and self-related health, also a generalized Poisson regression was used to show the relationship that exist between financial inclusiveness and how frequently older people used health services. Their findings showed that having a bank account considerably enhanced outcomes for both mental and self-related health. The link between the uses of healthcare services, however, was weak. They also revealed that among older persons, holding a mobile money account and belonging to a credit union were linked to higher usage of healthcare services and lower levels of mental health. The approach

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used in their study, however, failed to establish any causal relationships between the variables, which was one of the paper's weaknesses (Gyasi et al., 2019).

In Nigeria, Ajefu, Demir and Haghpanahan (2020) also examined the influence financial inclusion has on mental health in Nigeria, where depression was used as proxy for mental health. Using data from the General Household Survey of Nigeria, the study employed two-stage least square (2SLS) estimation, using household proximity to the closest financial institution as the instrumental variable for financial inclusion. It also noted the possible pathways by which financial inclusion may affect mental health, such as food expenses, remittances and risk-coping mechanisms. The results of their research support mounting evidence of the benefits of inclusive finance in reducing symptoms of depression and improving mental wellness.

Although these studies demonstrate possible merits of financial inclusion on mental health, they underscore the need for additional research. Exploring the applicability of these findings across diverse cultural and demographic contexts and establishing causation are crucial. Accordingly, this paper aims to offer a comprehensive insight into the ways in which financial inclusion can affect individuals' mental health, aiding policymakers in formulating initiatives that effectively promote financial inclusion and address the growing concerns of depression, particularly in Ghana since there is paucity of literature on such the subject matter.

It is also important to note that most of these articles fail to address the potential negative consequences or unintended effects of financial inclusion on the targeted populations. While financial inclusion is generally seen as a

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positive development goal, there are concerns that promoting access to formal financial services without addressing the underlying systematic issues could lead to negative consequences, such as over-indebtedness or exploitation by financial service providers (Bridges & Disney., 2010) ,financial stress (Karakara *et al*., 2022) and fraudulence (Sebu *et al*., 2023).

Financial Inclusion and Subjective Social Welfare

Numerous studies have focused on the topic of financial inclusion and subjective social welfare. Financial inclusion has been shown to increase a person's sense of empowerment and social inclusion, improve their financial stability, and have a positive impact on their subjective social welfare (Ozili, 2020; Singh-Manoux et al., 2005; Appiah-Kubi, 2023). In addition, individuals with the ability to utilize financial services are more adequately prepared to manage their finances, make investments for the future, and shield themselves from financial shocks. As a result, people may feel more secure and in control of their financial situation, which might increase their subjective social welfare. An increasing body of research demonstrates the effect financial inclusion has on household welfare (N'dri & Kakinaka, 2020; Zhao et al., 2022). Thus, most of these studies portrays a positive effect of financial inclusion on household welfare.

Sakyi-Nyarko, Ahmad and Green (2022) studied the role of financial inclusion in improving household welfare in Ghana. In their paper, they measured financial inclusion taking into account all the dimension including availability, access, usage and quality. Regardless of how financial inclusion was measured or how endogeneity was controlled for, their main finding suggests that more financial inclusion leads to considerable improvement in

welfare. Their findings imply that improved financial inclusion enhances the likelihood that outcomes in terms of food intake, medical care, cash income, and school attendance will improve.

Similarly, Munyegera and Matsumoto (2016) used panel data from eight hundred and forty-six rural Ugandan households to examine the effects of mobile money and remittances on household welfare. The findings showed that access to mobile money had a positive and significant impact on household welfare, where welfare was determined by real per capita consumption. Also, they found that households that use mobile phones for financial transactions have higher chances of receiving money transfers on a frequent basis, and the amount received is most of the times higher than that of vulnerable households. Other studies have also looked into the relationship between financial inclusion and subjective well-being, another part of welfare that is concerned with a person's emotional and cognitive assessment of their lives, primarily their happiness and overall life satisfaction. Most of these studies showed that financial inclusion affect subjective wellbeing positively.

For instance, Wu, Zhao, and Guo (2023) looked into how using mobile payments affected people's subjective well-being in rural China. The findings showed that even after some thorough checks, adopting mobile payment has improved these residents' subjective well-being. Additionally, it was observed that the decline in transaction costs, the encouragement of consumption upgrade, and the rise in social networks all contribute to the good effect of mobile payment on subjective wellbeing. Furthermore, the results indicate that socially vulnerable populations, such as the elderly, those with lower incomes, or those with less education, are more likely to experience the favorable

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effects of mobile payment on subjective wellbeing. The results is no different from that of Zhao, Li, and Yan (2022) who also looked at the effect of digital finance on the happiness on a sample of Chinese residents. It was observed that there exist a positive association between mobile payment usage and residents' happiness (Zhao et al., 2022).

Other research also point to an adverse relationship between these variables, despite the apparent advantages of financial inclusion on subjective wellbeing. For instance, Xu and Sun (2022) examined investment behaviour of some Chinese residents and if their behaviour towards investment has an impact on their happiness. According to the study, inclusive finance both greatly raised resident investment engagement and simultaneously decreased their happiness. Therefore, it is important to conduct research that examines the potential negative effects of financial inclusion, as well as the positive effects, in order to inform the development of policies and interventions that can maximize the benefits of financial inclusion while minimizing any negative consequences. This could include looking at issues such as predatory lending practices, inadequate financial literacy, and consumer protection policies which could lead to issues of financial stress.

For instance, Mahdzan *et al.,* (2022) did a study with the purpose of analyzing the influence of financial behavior and stress on subjective financial well-being among low-income households in Malaysia. The study's findings provide several important insights. First, financial behavior and locus of control have a positive influence on subjective financial well-being, demonstrating the beneficial effects of good financial behavior and a sense of control. On the other hand, financial stress has a negative impact on subjective

financial well-being, suggesting that financial stress and a lack of financial literacy can reduce overall well-being. This stands to reason that literature on the relationship between financial inclusion and subjective wellbeing gives conflicting findings leading to an inconclusive result. The presence of divergent findings highlights the complexity of this relationship and the need for further research to better understand the underlying mechanisms and contextual factors that influence the association between financial inclusion and subjective wellbeing.

However, another strand of literature on individual welfare explore the effect of financial inclusion on people's subjective social welfare, where welfare here, measures a person's opinion of where they stand in society in comparison to others (Adler & Kwon, 2002; Appiah-Kubi, 2023). Few studies have looked into the relationship between financial inclusion and subjective social welfare. A study by Appiah-Kubi (2023) examined the relationship between financial inclusion and subjective social status. Using instrumental variable estimation with the distance to the nearest financial institution as the instrument, he found that financial inclusion is positively associated with subjective social status.

Subjective Social Welfare and Mental Health

There exists a body of literature with the assertion that there is significant empirical support for the relationship between subjective social welfare, or one's perceived place in the social hierarchy, and health outcomes which includes mental health. The relationship between subjective social welfare and mental health is of a complex nature, and factors such as individual personality and coping styles, can also play a role. According to

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research, those who believe they are socially and economically disadvantaged are more likely to suffer from mental health issues, especially depression (Tang *et al.,* 2016). Similarly, those who perceive themselves as having high social and economic status are more likely to report positive mental health outcomes (Euteneuer, 2014; Quon, & McGrath, 2014). Overall, there is evidence to suggest that subjective social welfare is an important predictor of mental health outcomes.

In Norway, Bøe, Dearing, Stormark, and Zachrisson (2018) conducted research on adolescent subjective economic positioon, its antecedents, and relationships with mental health. The study's objectives were to discover variables related to perceived economic well-being and investigate its relationships to depressive symptoms. Adolescents between the ages of sixteen and nineteen participated in the survey, which included information on reported economic well-being and other variables. According to the study, adolescents were more likely to report having a poor perception of their family's financial situation if they lived with single-parent families, non-working parents, or low income-to-needs households. Also, even after accounting for covariates, including income-to-needs, adolescents with lower perceived economic well-being reported higher depressive symptoms. But even though they found in their study that low socioeconomic status might have many effects on mental health, the precise processes were still not clearly defined.

A study on subjective happiness and health-related behaviours among 800 university students in India was also carried out by Peltzer and Pengpid in 2013. Their sample were 541 males which represent 67.6% of the sample

population and 259 females which represent 32.4% of the sample in the age range of 17 to 20 years. Subjective happiness was measured using a four-item scale with the first two item asking individuals to rate themselves both individually and in relation to their friends. Their multivariate analysis revealed that more social support, greater self-mastery, regular sleep patterns, no current tobacco use, and eating breakfast every day or nearly every day were linked to happiness. Furthermore, it was revealed that the relationship between their subjective welfare and a number of healthy behaviors, which is mediated by social variables, was partially validated by their findings. However, the study's clear causal pathway linking health behaviors and happiness remains unclear which became one of the paper's weakness (Peltzer & Pengpid, 2013).

Chipo Mutyambizi, Frederik Booysen, Per Stornes, and Terje A. Eikemo (2019) conducted a study in South Africa to examine the relationship between subjective social status and disparities in depressive symptoms. The study utilizes a cross-sectional design and relies on data from the 2014 South African Social Attitudes Survey (SASAS). Notably, the analyses conducted in this study are disaggregated by gender, allowing for a more nuanced examination of potential gender-specific variations in depressive symptoms. The findings of the study revealed substantial inequalities in depressive symptoms associated with subjective social welfare, particularly favoring individuals with higher social status. The study further identified that the observed disparities in depressive symptoms were primarily attributed to subjective social welfare itself (i.e. the individual's perception about himself

in relation to others), followed by factors such as race and past childhood conflict.

Conceptual Framework

Figure 1 is the formulated conceptual framework of the study
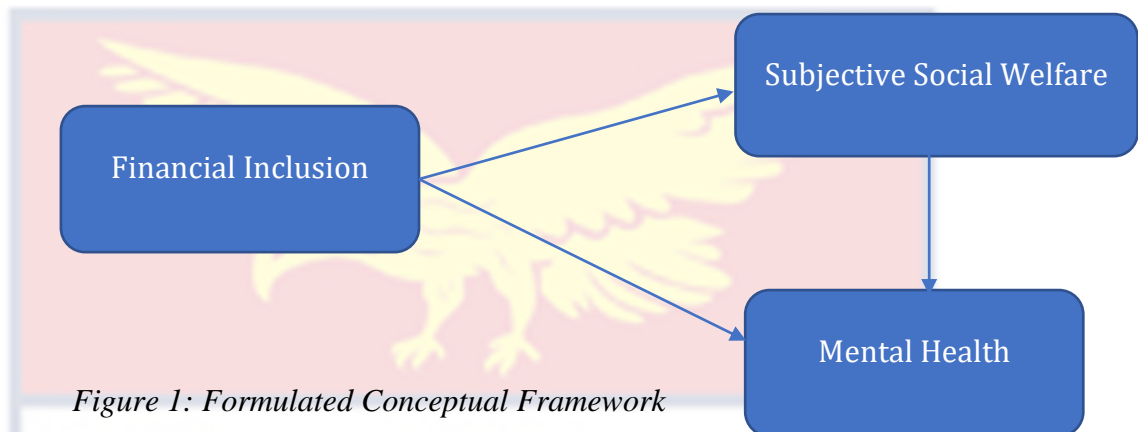
Figure 1: Formulated Conceptual Framework

Source: Author's construct (2023)

Chapter Summary

Financial inclusion is an essential aspect of promoting individual subjective social welfare and mental health issues especially depression. The chapter evaluated relevant literature on financial inclusion, subjective social welfare and mental health in three thematic. That is, on the relationship between subjective social welfare and mental health, financial inclusion and mental health and also financial inclusion and subjective social welfare. The empirical data demonstrated that there are significant relationship between financial inclusion and subjective social welfare. Most of the studies found that financial inclusion leads to a positive subjective social welfare and improved mental health. While some results are encouraging, others are bad as well. The capability approach, social capital theory and Grossman's health capital theory were the theories used in the research. The conceptual framework which will guide the study is also presented in the chapter.

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CHAPTER THREE

RESEARCH METHODS

This chapter covers the various methods used to address the objectives of this study. Specifically, the chapter is divided into these sections: it outlines the research design, research approach, data sources, data management and generation of variables, econometric specifications and estimation techniques and lastly measurement of variables.

Research Design

The research philosophy employed in the study is based on positivism. The approach aligns with the quantitative dimension whereas the longitudinal research design was employed to achieve the study's goals. Our adoption of the longitudinal research design was primarily motivated by the Ghana Socio-economic Panel Survey's ability to observe changes in individuals across time. With this, we may examine the relationships between changes in financial inclusion and other variables, such as subjective social welfare or mental health in this case, throughout a period of time, while adjusting for individual-specific variation. The study employed complex statistical analyses to examine these relationships and draw statistical inferences. Quantitative data is well-suited for these purposes as it allows us to apply statistical models, especially with our utilization of the fixed effect model to look at the significance of relationships between variables. The study follows the positivist research philosophy because it values objectivity in research, aiming to minimize bias and subjectivity (Alharahsheh, & Pius, 2020). That apart, positivism aligns itself with quantitative research approach.

Data Source

The paper utilizes secondary data from the Ghana Socio-economic Panel Survey (Osei *et al*., 2022) to study the relationship that exist between financial inclusion, subjective social welfare and mental health in Ghana. The Institute of Statistical, Social and Economic Research (ISSER) of the University of Ghana (Legon) and Yale University's Economic Growth Centre collaborated on bringing the Ghana Socioeconomic Panel Survey. A fundamental obstacle to comprehending progress in low-income countries like Ghana is what the survey intends to overcome. It is challenging to analyse relationships between variables due to the lack of extensive, multi-level, and long-term scientific data that tracks individuals through time and characterises both the natural and man-made environments in which they live. The GSPS is a three-wave data with the first wave was carried out in 2009/2010, followed by the second in 2013/2014 and the third in 2017/2018, which is the current as at the time this study is being conducted.

This study utilized the GSPS in a panel regression specification. In the survey, wave 1 covers 5009 households, wave 2 covers 4,774 households and wave 3 covers 5669 households from 334 enumeration areas and all ten regions across the country as at the time. The survey successfully utilized 18,889 household individuals, 16,356 individuals and 19,006 individuals from wave 1, 2 and 3 respectively. The unit of analysis for this study is the individual. The survey covers a wider range of aspects including household assets such as livestock, tools, durable goods and financial assets, household consumption and expenditure, psychology and social network, housing characteristics and many more. The instrumental variable which is the number

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of financial institution per region was not obtained from the Ghana Socio-economic Panel Survey. The information on bank and non-bank financial institution (NBFI) was retrieved from the Bank of Ghana website (Bank of Ghana, 2023). However, information on the number of bank and non-bank financial institution branches was found on each bank's official website. In all, twenty-one banks and non-bank financial institution were sampled. They include universal banks and savings and loans.

Data Management and Generation of Variables

We used the version 17 of the Stata Statistical Software for the data management and analysis. The variables needed were generated from each wave of the GSPS. Each wave contains datasets from which the variables used in the study were derived. Datasets containing the variables sex, age, marital status, regions and their codes, locality, education, insurance, savings, borrowing, depression, subjective social welfare, household income and household size taken from each wave were merged together to form a single dataset. Data generated on bank and non-bank financial institutions was merged with these datasets. Information on these banks (i.e bank branches) includes regions where these institutions were located and their respective regional codes. The Ghana Socioeconomic Panel Survey has the region variable running through all the waves so it was easier to merge with the singular merged dataset on each wave with the data on the banks and its number of branches per region. The unique identifier will be the regional code, the region and the wave. The merged data from each wave is then appended to form the primary dataset used in the study.

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Econometrics Specification and Estimation Techniques

Fixed Effect Model

A major aspect in the formulation and estimation of panel data models is whether there is unobserved heterogeneity which is correlated with the covariates. The study employs the fixed effect model as the baseline model. Fixed effects models are employed when there is unobserved heterogeneity that is thought to have been connected with one or more of the covariates. That apart, Fixed Effects (FE) model is a technique that is particularly helpful within the framework of establishing causation (Brüderl, & Ludwig, 2015; Gangl, 2010) and its ability to produce unbiased results. When there are unobserved heterogeneity, traditional regression models such as the pooled OLS can produce biased estimates of causal effects. Furthermore, a Hausman test on the selection of model between OLS, Random Effect and Fixed Effect was estimated and the test settled on FE.

The model is specified as:

$$Y_{it} = \alpha_i + X_{it}\beta + \epsilon_{it} \qquad \text{for i=1,…,N; t=1,…,T} \qquad , \qquad (1)$$

where Y_{it} shows the observed outcome of individual i at time t, X_{it} is a vector of independent variables of individual i at time t and β represent the vector of parameters to be estimated. The error term of this model captures two components. That is, α_i and ϵ_{it}. This is the error component model. Hence the α_i are unobserved effects that captures time-invariant individual heterogeneity and ϵ_{it} are the idiosyncratic error that vary between individuals and over time. The model is bounded by certain assumptions with the key assumption being the assumption about how consistent the FE estimator is.

This presumption is the strict exogeneity requirement put on the idiosyncratic errors.

$$E\,(\epsilon_{it}\,|\,X_{it},\dots,X_{IT},\,\alpha_i) = E\,(\epsilon_{it}\,|\,X_{it},\,\alpha_i) = 0 \qquad (2)$$

The strict exogeneity implies that the regressors and the idiosyncratic error are not correlated. Not only that does the assumption rule out but also the relationship between past and present values of regressors and errors. Another assumption has to do with the fact that there should not be any correlation between the individual effect and the error term; i.e. $E\,(\alpha_i,\epsilon_{it}) = 0$. The key insight from the FE model is that alterations in the dependent variable must stem from factors other than these fixed characteristics if the unobserved variable does not vary over time.

Estimation of the FE Model

One method for estimating the FE model is the use of within-group or time-demeaning transformation. At this point, we substract the over-time means from the raw data.. In cases where the transformation (also known as "demeaning" or "within transformation") captures variance within subjects across time but leaves out variation across units, FE estimation uses Pooled OLS on the transformed data. When we average equation 3.1 over time, we get;

$$\bar{Y}_i = \alpha_i + \bar{X}_i\beta + \bar{\epsilon}_i \qquad , \qquad (3)$$

where $\bar{Y}_i = \sum_{t=i}^{T} \text{Yit}\,/\text{T}$, $\bar{X}_i = \sum_{t=i}^{T} \text{Xit}\,/\text{T}$ and $\bar{\epsilon}_i = \sum_{t=i}^{T} \epsilon\text{it}\,/\text{T}$ are all person-specific means.

We can find the demeaned regression by subtracting (3) from (1). This yields;

$$Y_{it} - \bar{Y}_i = (X_{it} - X_i)\,\beta + (\epsilon_{it} - \bar{\epsilon}_i) \qquad (4)$$

It can be seen in equation (4) that the demeaning process has removed the individual heterogeneity α_i and any bias that might stem from its correlation with the covariates. In other words, they are considered to be nuisance parameters that do not require consistent estimation.

Alternatively, we can write (4) as;

$$\ddot{Y}_{it} = \ddot{X}_{it}\beta + \ddot{\epsilon}_{it} \tag{5}$$

Where, $\ddot{Y}_{it} = Y_{it} - \bar{Y}_i$, $\ddot{X}_{it} = X_{it} - X_i$, and $\ddot{\epsilon}_{it} = \epsilon_{it} - \bar{\epsilon}_i$. Conventionally, the fixed effect estimator can be derived by substituting expectations by sample moments. So that we can write (5) as a system of T OLS equations;

$$\ddot{Y}_i = \ddot{X}_i\beta + \ddot{\epsilon}_i \tag{6}$$

Where $\ddot{Y}_i$ and $\ddot{\epsilon}_i$ are T×1, $\ddot{X}_i$ is T×K and β is K × 1 . Premultiplying (6) by $\ddot{X}_i^{`}$, when we take expectations and solve for β, we get

$$\ddot{X}_i^{'}\ddot{Y}_i = \ddot{X}_i'\ddot{X}_i\beta + \ddot{X}_i'\ddot{\epsilon}_i$$

$$E(\ddot{X}_i^{'}\ddot{Y}_i) = (\ddot{X}_i'\ddot{X}_i\beta) + E(\ddot{X}_i'\ddot{\epsilon}_i) \tag{7}$$

$$E(\ddot{X}_i^{'}\ddot{Y}_i) = \beta E(\ddot{X}_i'\ddot{X}_i)$$

$$\beta = \left[E(\ddot{X}i`\ddot{X}i)\right]^{-1}E(\ddot{X}i`\ddot{y}i) \tag{8}$$

The rank condition however, must hold for $E(\ddot{X}i`\ddot{X}i)$ to be nonsingular or invertible. Given that both the rank restriction and strict exogeneity are met, the fixed effect estimator is given as

$$\widehat{\beta_{FE}} = \left(\sum_{n=1}^{N} \ddot{X}i`\ddot{X}i\right)^{-1}\left(\sum_{n=1}^{N} \ddot{X}i`\ddot{y}i\right) \tag{9}$$

Empirical Model for the Fixed Effect Regression

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Objective 1:

Empirically, the FE regression is specified as:

$$Dep_{it} = \beta_0 + \beta_1 FI_{it} + \beta_2 Age_{it} + \beta_3 hhs_{it} + \beta_4 Householdincome_{it} +$$

$$\beta_5 Locality_{it} + \beta_6 MaritalStatus_{it} + \beta_7 Sex_{it} + \beta_8 Education_{it}$$

$$+ \alpha_i + \epsilon_{it} \tag{10}$$

Where i and t represent individual and time respectively. Dep indicates depression status of individual i at time t as the dependent variable. FI_{it} captures financial inclusion of individual i at time t, Age_{it} captures the age of individual i at time t, hhs_{it} represents the household size of individual i at time t , $Householdincome_{it}$ denotes the income of individual i at time t, $Locality_{it}$ represents the location of individual i at time t, $MaritalStatus_{it}$ captures the marital status of individual i at time t, Sex_{it} captures the gender of individual i at time t and $Education_{it}$ individual i's education status at time t. ϵ_{it} is the error term, α_i captures time-invariant individual heterogeneity and β are the parameters to be estimated.

Objective 2:

Empirically, the FE regression is specified as:

$$SSW_{comm_{it}} = \beta_0 + \beta_1 FI_{it} + \beta_2 Age_{it} + \beta_3 hhs_{it} + \beta_4 Householdincome_{it}$$

$$+ \beta_5 Locality_{it} + \beta_6 MaritalStatus_{it} + \beta_7 Sex_{it} + \beta_8 Education_{it}$$

$$+ \alpha_i + \epsilon_{it} \tag{11}$$

$$SSW_{Ghana_{it}} = \beta_0 + \beta_1 FI_{it} + \beta_2 Age_{it} + \beta_3 hhs_{it} + \beta_4 Householdincome_{it}$$

$$+ \beta_5 Locality_{it} + \beta_6 MaritalStatus_{it} + \beta_7 Sex_{it} + \beta_8 Education_{it}$$

$$+ \alpha_i + \epsilon_{it} \tag{12}$$

Where i and t represent individual and time respectively. The dependent variables, SSW_comm_{it} and SSW_Ghana_{it} indicates subjective social welfare (in relation to the community) and subjective social welfare (in relation to Ghana) of individual i at time t respectively. FI_{it} captures financial inclusion of individual i at time t, Age_{it} captures the age of individual i at time t, hhs_{it} represents the household size of individual i at time t , $Householdincome_{it}$ denotes the income of individual i at time t, $Locality_{it}$ represents the location of individual i at time t, $MaritalStatus_{it}$ captures the marital status of individual i at time t, Sex_{it} captures the gender of individual i at time t and $Education_{it}$ individual i's education status at time t. $\in_{it}$ is the error term, α_i captures time-invariant individual heterogeneity and β are the parameters to be estimated.

Instrumental Variables Regression

We believe that the association that exist between financial inclusion, subjective social welfare and mental health is prone to the problem of endogeneity. Financial inclusion, which is our main variable of interest, can prove to be endogenous for some reasons. For instance, depression (used as a proxy for mental health) can affect individuals' financial inclusion than vice versa. This causes endogeneity arising from reverse causality. That apart, endogeneity may arise from omitted variable bias. That is, some variables that have effect on both financial inclusion and the outcome variable may have been omitted. We employed the Two-Stage Least Squares Regression (2SLS) to address this issue using the number of financial institution per region as an instrument. The prospective instrument should meet these necessary conditions for it to be considered a good instrument. The first is the instrument

should be correlated with the endogenous variable i.e. $E(X_{en}|Z) \neq 0$. The second is the exogeneity condition which states that the instrument should be uncorrelated with the error term i.e. $E(\mu|Z) \neq 0$. The third has to do with the exclusivity condition which says the instrument should not be correlated with any other factors that directly affect the dependent variable apart from its effect through the endogenous variable. The model for the 2SLS is specified as follows;

First Stage:

$$FI_{it} = \beta_1 Z_{it} + \beta_2 \gamma_{it} + \alpha_i + \epsilon_{it} \tag{13}$$

Where FI_{it} is the endogenous variable (Financial Inclusion Index) of individual i at time t, Z_{it} is the instrument variable (number of financial institutions per region) for region i at time t; α_i represents individual-specific fixed effects to control for unobserved heterogeneity; γ_{it} represents a vector of control variables specific to individual i at time t and ϵ_{it} represents the error time.

Second Stage:

$$Y_{it} = \beta_3 \widehat{FI}_{it} + \beta_4 \gamma_{it} + \alpha_i + \epsilon_{it} \tag{14}$$

Where Y_{it} is the outcome variable (depression, subjective social welfare) for individual i at time t. $\widehat{FI}_{it}$ represents the predicted values of financial inclusion from the first stage.

Mediation Analysis

In the estimation of the third objective, we performed the mediation analysis using the Structural Equation Model (SEM). The concept of mediation describes the process by which an independent variable's (X) effect is transferred to a dependent variable (Y) through a third mediator variable's

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(M) influence (Pardo & Román, 2013). We employed the Baron and Kenny (1986) approach to mediation which involves sequentially verifying each of the following conditions.

Condition 1: Variables financial inclusion (X) and depression (Y) must be related, that is, the estimated coefficient θ in Figure 2 must be different from zero in the expected direction. The linear regression analysis of the financial inclusion-depression is used to verify this condition.

$$Depression_{it} = \propto_1 + \theta Financial\ Inc_{it} + \in_{it} \qquad (15)$$

Where $\propto_1$ is the constant term, θ is the regression coefficient that relates financial inclusion to depression, $depression_{it}$ represents depression of individual i at time t, $Financial\ Inc_{it}$ represents financial inclusion of individual i at time t and finally $\in_{it}$ is the error term.

Condition 2: Variables financial inclusion (X) and subjective social welfare (M) must be related, that is, the estimated coefficient δ from Figure 2 must be different from zero. This condition is verified using a linear regression analysis of subjective social welfare over financial inclusion.

$$SSW_{it} = \propto_2 + \delta Financial\ Inc_{it} + \omega_{it} \qquad (16)$$

Condition 3: In the context of causal inference, it is expected that there is a connection between variables SSW (M) and depression (Y) when the influence of financial inclusion (X) is taken into account. In other words, the coefficient π in Figure 2 should not be equal to zero. To confirm this, a linear regression analysis is performed, examining the relationship between depression (Y) with both financial inclusion (X) and subjective social welfare (M):

$$Depression_{it} = \propto_3 + \delta Financial\ Inc_{it} + \pi SSW_{it} + \mu_{it} \qquad (17)$$

SEM Builder

Total Effect: $\theta' = \delta\pi + \theta$

Direct Effect: $\theta = \theta' - \delta\pi$

Indirect Effect: $\delta\pi = \theta' - \theta$
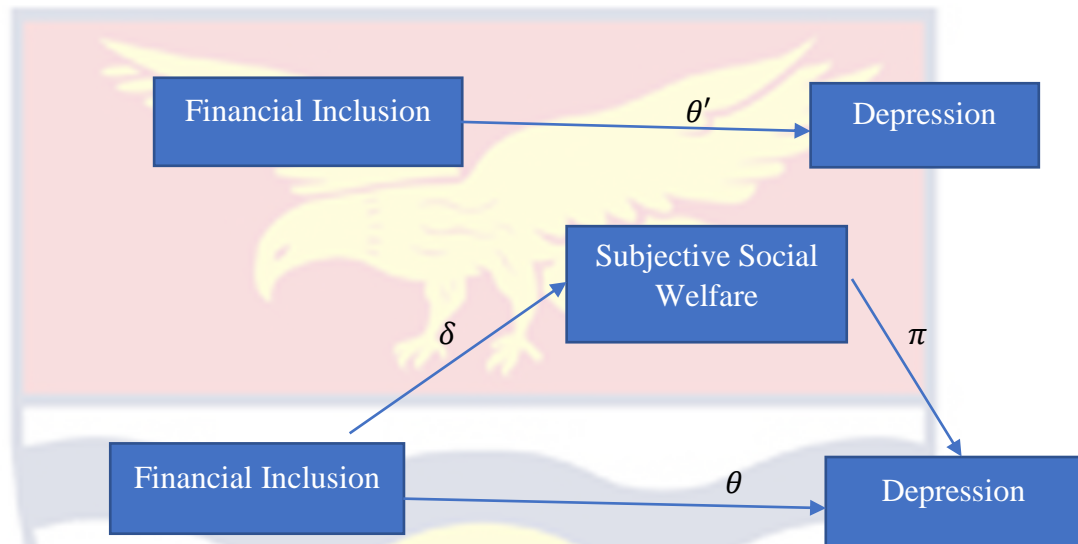
Figure 2: Details of the Baron and Kenny (1986) Approach to mediation
Source: Author's construct (2023)

The relationship between financial inclusion and depression must significantly decrease when controlling for the indirect effect of subjective social welfare. In other words, the coefficient θ' (representing the direct effect in Figure 2) should be less than the coefficient θ (which denotes the total effect in Figure 2). According to Baron and Kenny (1986), the strongest mediation demonstration is when θ is zero (full mediation). Thus, there is total mediation or full mediation when all of the effect of financial inclusion on depression goes through subjective social welfare and partial mediation when only part of the effect of financial inclusion goes through subjective social welfare.

Heterogeneity and Sub-Component Analysis

As part of the objectives of the study, we seek to analyze the relationship between financial inclusion, subjective social welfare and mental health at a deconstructed level of sex, marital status and locality. This heterogeneity analysis helps identify disparities and inequalities that may exist within different demographic groups. That apart, we intend to perform a component level analysis on the financial inclusion index to examine the nuance effect the different indicators of financial inclusion may have on mental health as well as subjective social welfare (Aguila *et al.,* 2016; Ajefu *et al.,* 2020; Appiah-Kubi 2023). This sub-component analysis may allow us to identify which specific components are most influential and intervention targeting.

Measurement of Variables

Financial Inclusion

The study characterizes an inclusive financial system as one that maximizes accessibility and usage while reducing unintended financial exclusion. There are various ways that authors have measured financial inclusion. Koomson and Ibrahim (2018) used data from the GLSS 6 to build an index for financial inclusion. The financial inclusion index was developed by the authors, using 14 indicators. According to them, utilizing the additive index approach to create an index does not cause indicators' characteristics to be lost. We employ an additive approach to create a financial inclusion index by summing all the individual financial inclusion indicators. This methodology has been previously utilized to construct indices for measuring entrepreneurial traits (Peprah, Afoakwah, & Koomson, 2015), employment

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security (Nunoo, Darfor, Koomson, & Arthur, 2016), and financial stress (Koomson, Afful Jr, & Villano, 2017; Koomson & Ibrahim 2018). The indicators used in this study, however, include ownership of savings account (mobile money account or at a banking institution), access to loans and credits, ownership of an insurance policy (life or general) as shown in Table 1. These indicators are in line with the work of Ajefu *et al*., (2020). Given that each of these indicators has a binary value, the resulting index is anticipated to range between 0, and 3, which represents strong financial inclusion.

Table 1: Description of the Main Financial Inclusion Index

Variable	Description
Loan	Does anyone in this household currently owe money to other people or have outstanding loans from banking institutions?
Savings Account	Do you have any savings kept with a banking institution, susu or any other savings society/group?
Insurance	Does anyone in this household currently have an insurance policy?

Source: Ghana Socio-economic Panel Survey (W1-W3)

Number of financial institutions

Number of financial institution is the instrument used in this study to circumvent the issue of endogeneity that might arise in the relationship between the outcome variable and financial inclusion as the main regressor of interest. It is determined as the number of bank and NBFI in a region. Consistent with literature, the number of financial institutions is expected to affect financial inclusion positively (Demirguc-Kunt & Klapper, 2012; Adonu, 2020).

Depression

Depression is used as the main proxy to measure mental health in the study. We constructed an additive index comprising of six indicators out of the ten indicators on the Kessler Psychological Distress Scale (K10). The Scale is a measure for evaluating mental health by examining 10 distinct symptoms connected to depressive and anxious moods. The scale consists of ten questions, each with a five-level response graded on a scale of one ("none of the time") to five ("all of the time"). We followed the work of Brooks *et al*., (2006), who named questions 1, 4, 7, 8, and 10 as the six items assessing depression on the scale (see, Table 2). The primary rationale is to align the scale more closely with the specific construct of the study which is depression. By removing items that measure other aspects of mental health, we ensure that the scale is directly measuring the aspect of interest (depression). The scores of the six questions are summed up, yielding a maximum total of 30 and a minimum of 6.

Table 2: Description of the Main Depression Index
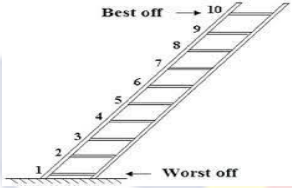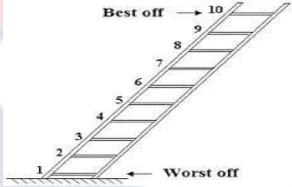
Variable	Description
1. Tiredness	How frequently have you felt tired without any apparent cause?
4. Hopeless	How frequently did you feel nervous?
7. Depressed	How frequently did you feel depressed?
8. Effortful	How frequently did it seem like everything was an effort to you?
9. Uncheerful	How frequently did you feel so sad that nothing could make you feel better?
10. Worthless	How frequently did you feel worthless?

Source: Ghana Socio-economic Panel Survey (W1-W3)

Subjective Social Welfare

In this study, subjective social welfare is a continuous variable that measures the position of an individual in society in relation to others. It stands for a person's contribution to the society, their interactions with others in society, the importance of their abilities to society, and their responsibilities in general (Ordyan, 2018). The MacArthur Scale of Subjective Social Welfare was used in this study (Cundiff *et al*., 2013; Singh-Manoux *et al*., 2005). It evaluates a person's perceived comparative standing in a society or nation based on their educational attainment, economic situation, and social background. The scale is represented by a 10-rung ladder diagram, with the highest rung denoting the most highly positioned persons and the lowest rung denoting the least highly placed individuals in the community or Ghana (See, Table 3). In the survey, SSW is measured in relation to the community the individual lives in (SSW_Community) and also in the nation as well (SSW_Ghana). The study performs analysis on each of these measures.

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Table 3: Measurement of Subjective Social Welfare

SSW_Community	SSW_Ghana
Consider that this ladder is a representation of your community, with each rung standing for a different position that residents of your village occupy inside it. Imagine that one of the rungs of this ladder represents each member of this community. The individuals with the highest positions in the community are located at the top of the ladder. The individuals with the lowest status in the community are located at the bottom of the ladder. Comparing yourself to other members of your community, where would you be on this ladder? Please indicate by circling which step you would be on if the steps were numbered 1 through 10. .	Consider that Ghana's population would be represented by the ladder. The people with the most resources, the best education, and the most respected jobs would be at the top of the ladder. Those with the least amount of money, least amount of education, least reputable work, or no job, would be at the bottom of the ladder. In relation to the rest of Ghana's population, where would you be on this ladder? Please indicate by circling which step you would be on if the steps were numbered 1 through 10.

Source: Ghana Socio-economic Panel Survey (W1-W3)

Age

Age is a continuous variable which measures the age of the individual household members. In many literatures relating to financial inclusion, subjective social welfare and mental health, age of the individual is seen as

one of the control variables in estimating such association. In this study, the Age variable includes all individuals over 12 years. Age, just as in most literature, is expected to have a positive relationship with depression (Weiss Wiesel *et al*., 2015; Mackenzie *et al*., 2019). However, with subjective social welfare, its sign is indeterminate.

Gender

Sex, in this study is a binary variable which shows whether an individual is male or female. Being a female is coded 0 and a male takes the value of 1. Many literatures posit that being a female increases depressive symptom (Derry *et al*., 2015; Bangasser & Cuarenta, 2021). In the regression, sex is represented as Male because Female is used as the base. With depression, the sign may be positive if male is used as the base and negative otherwise. However, with subjective social welfare, the sign is indeterminate.

Marital Status

The variable marital status is categorical variable which identifies whether the individual is currently married or not. In the Ghana Socio-economic Panel Survey, marital status is categorized into seven namely; married, separated, divorced, consensual, never married, betrothed and widowed. The categories were recoded into married (comprising married, separated and consensual) which takes the value of 1 and unmarried (comprising never married, betrothed, widowed and divorced) which is coded 0. According to Williams and Carlson (2010), on average getting into marriage reduces depression and staying unmarried increases depression, in a short run. This is also consistent with the works of Lindström and Rosvall (2012). Following these works, we expect an inverse relationship between

married individuals and depression hence a negative sign and vice versa. There is also a strand of literature that suggest a direct relationship between married individual and subjective social welfare (Greenstein, 2016; Ndayambaje, *et al.,* 2020) hence a positive sign is expected.

Education

In this study, education denotes whether the individual has ever attended school or not. If the individual has ever attended school, we denote it as "Yes," which is coded as 1. If the individual has never attended school, we assign the value 0, indicating "No". It is expected that education should be positively related to subjective social welfare hence a positive sign. The positive association is consistent with the work of Kristoffersen (2018). Studies have also revealed that education is associated with lower likelihood of depression (Ibrahim, Kelly, & Glazebrook, 2013). This stands to reason that with depression, the expected sign is negative.

Locality

The variable locality refers to the residence of the individual. The variable is a binary variable with outcome being whether rural or urban. Depending on which category is used as a reference point, the predicted sign will change. Many literature assert that living in the rural area, increases your chances of getting depressed (Brossart *et al.,* 2013; Viswanathan & Kumarasamy, 2019). With depression, the sign is expected to be positive if urban becomes the base and negative otherwise. If the individual is a rural resident, we assign the value 0 and if an urban resident, we assign the value 1.

Household Income

Household income in the study refers to the amount of money received by individual in the household for work done. Income here includes any bonuses, commissions, allowances or tips received for work done. According to Hinata *et al.,* (2021), higher income levels are associated with lower levels of depression. Furthermore, studies have shown a positive relationship between household income and subjective social welfare (Diener, et al., 2013; Headey & Wooden 2004). Household income, in this study, is a continuous variable. With the relationship with depression, we expect a negative sign and with subjective social welfare, we expect a positive sign

Household Size

Household size in this study describes the number of people who share a single housing unit and common living arrangements within the household. There are conflicting findings in the literature about the link between depression and household size. While some line of research reveal a positive correlation (Riordan, et al., 2012), others suggest a negative correlation (Grinde & Tambs, 2016). In this study, household size is a continuous variable and the sign is indeterminate.

Robustness Checks

To check for the robustness of the results, we constructed an index for depression utilizing the six items on the Kessler Scale as discussed above, with the use of Principal Component Analysis (PCA). The aim of the PCA is to capture the meaningful data patterns and represent them as a collection of new orthogonal variables known as principal components. We expect the results to be consistent with that of the additive approach. That apart, when

using panel data, observations on several entities (such as people, businesses, or nations) are frequently recorded throughout a range of time periods and this is characterized by the presence of individual heterogeneity. Between the fixed effects and random effects models, the distiction lies in how they handle the unobserved individual-specific heterogeneity. To determine whether the adoption of a fixed effect model or random effect model is suitable, we employed the Hausman test. If there is heteroscedasticity present in the data, traditional standard errors may be biased. To enhance the robustness of this study, we also employed fixed-effect robust estimation which reports robust standard errors hence the reduction of heteroscedasticity.

Chapter Summary

The chapter focuses on the methodology used in the study. This study employs the quantitative approach to test hypotheses. We begin with a rigorous discussion of the research design. To accomplish the study's objectives, the study adheres to the positivist research philosophy and quantitative research approach, and also the longitudinal design. The use of longitudinal design in research enables researchers to monitor changes and advancements through time. It is particularly beneficial when the study aims to comprehend trends, patterns, or changes in a certain phenomenon across time. This makes it suitable for establishing cause and effect relationships. Secondary data with variables from all waves of the Ghana Socio-economic Panel Survey was used. The GSPS is a three-wave data with the first wave conducted in 2009/2010, the second 2013/2014 and the third in 2017/2018. Information on banks as well as non-bank financial institutions (NBFI) were

obtained from the Central Bank's website with the number of Bank's branches obtained from the selected bank's individual website.

We sampled twenty-one banks and non-bank financial institutions. The unit of analysis was at the individual level and we used the version 17 of the Stata Statistical Software to do the analysis. In this chapter, we specified both the empirical and theoretical model for the study. Objectives 1 and 2 are estimated with the fixed effect model as the baseline model. The model controls for unobserved heterogeneities which is very key when it comes to panel data analysis. That apart, because of the endogeneity inherent in the financial inclusion variable we used the 2SLS estimation to circumvent that. For objective 3, which entails the mediation role of SSW in the financial inclusion-depression nexus, we estimated the Baron and Kenny's approach of mediation using the structural equation model. Heterogeneity analysis and sub-component analysis of the financial inclusion variable were also highlighted in this section. We further discussed how the various variables used the study were measured and their expected 'a-priori'. Information on how robust the results were was also provided.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter primarily focuses on presenting and interpreting the statistical analyses conducted to achieve the study's objectives. Tables accompany the analysis to visually represent the relationships between variables, as observed through descriptive and regression analyses. Starting with descriptive statistics, the chapter delves into regression results, comparing them with existing research in the field. The structure of the chapter aligns with the research objectives.

Summary Statistics

Table 4 displays the descriptive statistics of the variables used in the study. Considering the variable depression, there were 28910 observations focusing on 15045 individuals across all waves. The overall mean score is 11.25, suggesting that on average, participants reported experiencing depression at a relatively low to mild level. With a standard deviation of 4.541, it shows that there is some variation in how depressed people were. The within standard deviation shows that the changes in depression within each individual is about 2.876 but between other individuals the variability is about 3.897. The overall mean score for financial inclusion in the observation is 0.943, meaning most people in the observation are fairly financially included. The within standard deviation which shows how the financial inclusion score changes within each individual over time is 0.412 but in comparison between different individuals, the score is about 0.588. The average age of all observations covered in the survey is about 37years with 120years old being the oldest individual.

On average, the income an individual receives for work done is approximately GHS 31.35. The wide standard deviation for household income implies significant variation in reported earnings. When we compare income between different individuals, the average income difference is about GHS 212.02. This confirms that there are significant income variations when comparing incomes between different individuals. The actual number of individuals used for this between-individual analysis is 28674. Moreover, the overall mean household size in the total observation is approximately 5. The smallest household size observed is one person, meaning that there is a single-person household in the dataset. The maximum household size is 20. There are also some variations in the household sizes between different households.

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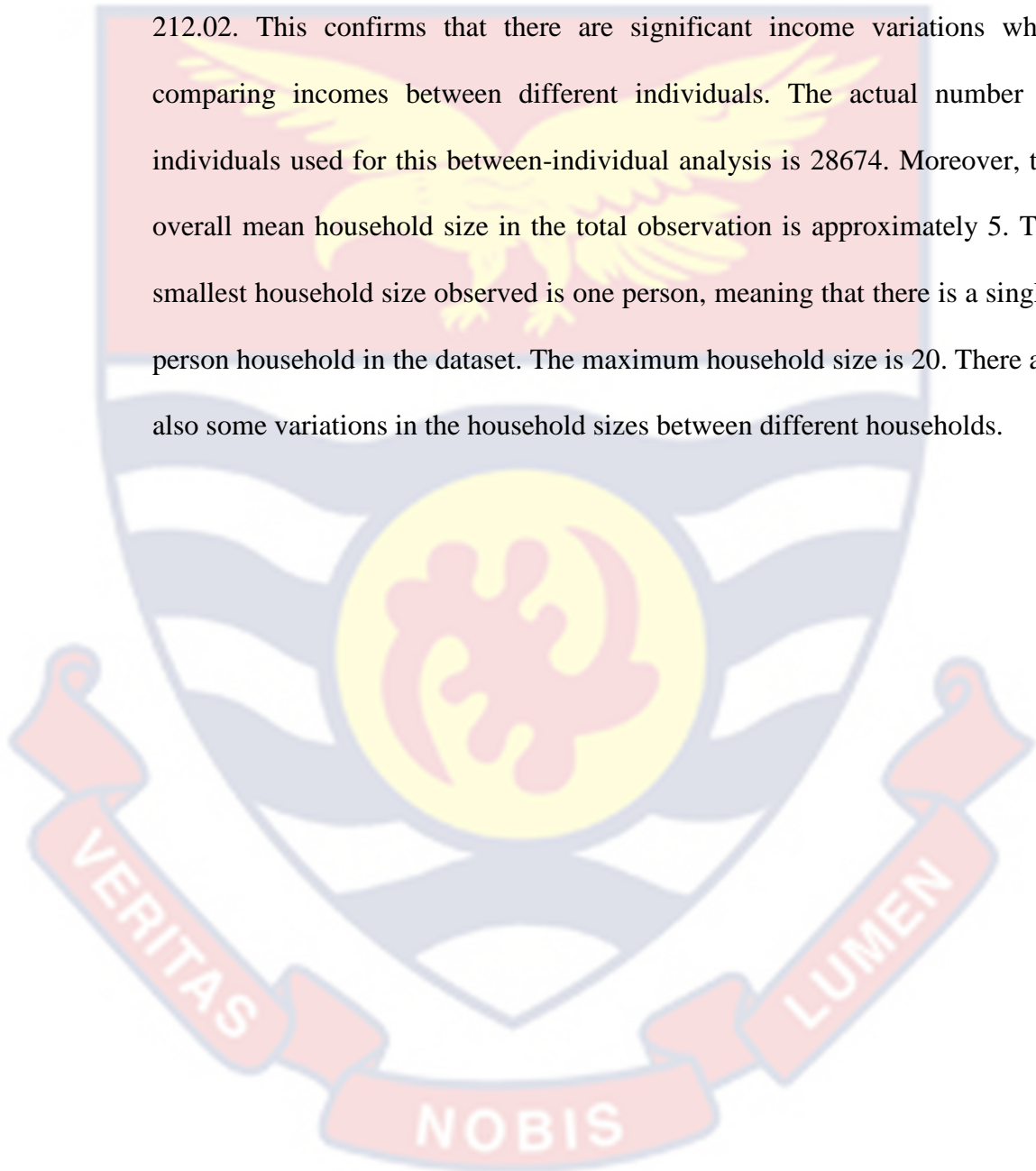
Table 4: Descriptive Statistics for Continuous Variables

Variable		Mean	Std. Dev	Min	Max	Observations
Depression	Overall	11.250	4.541	0	30	N = 28910
	Between		3.897	0	30	n = 15045
	Within		2.876	-3.083	26.250	T-bar = 1.922
FI	Overall	0.943	0.700	0	3	N = 55074
	Between		0.588	0	3	n = 28694
	Within		0.412	-1.057	2.943	T-bar = 1.919
Age	Overall	37.656	19.340	13	120	N = 36141
	Between		19.106	13	120	n = 19667
	Within		3.660	-9.678	76.322	T-bar = 1.838
HH_Income	Overall	31.353	335.371	0	48000	N = 54935
	Between		212.021	0	16000	n = 28674
	Within		247.003	-0.00160	32031.350	T-bar = 1.916
HH_Size	Overall	5.162	2.737	1	20	N = 55074
	Between		2.616	1	20	n = 28694
	Within		0.989	-5.838	12.162	T-bar = 1.919
SSW_Comm	Overall	4.879	2.590	0	10	N = 28007
	Between		2.135	0	10	n = 14743
	Within		1.745	-1.788	11.212	T-bar = 1.900
SSW_Ghana	Overall	3.965	2.835	0	10	N = 27936
	Between		2.303	0	10	n = 14721
	Within		1.949	-2.702	10.298	T-bar = 1.898
Fininst_total	Overall	70.129	89.877	6	427	N = 55074
	Between		85.452	6	427	n = 28694
	Within		28.572	-138.371	349.129	T-bar = 1.919

Source: Computed from Ghana Socio-Economic Panel Survey (W1-W3)

Table 5 displays the dynamics that exist between the categorical variables used in the study. It can be seen that out of the 53772 total observations, 52.21% were females and 47.79% were males. Under the 'Between Category', when we compare males to females, about 47.65% males

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were part of this comparison and 53.56% were females. The total number of individuals (28720) exceeds the actual number (28378) because of data reporting issues. There is no much variations among each category as it can be seen from the 'within' section. It means when we observe an individual to be a female, she will remain a female for almost 99% of the time we observe them. The same applies to being a male. Furthermore, it can be seen that among the total observations about 34.31% of individuals are married and approximately 65.69% are unmarried.

This statistic shows that out of all the observations in the dataset, 65.68% are located in rural areas and 34.02% are located in urban areas. The 'between category' basically tells us how much the groups differ from each other. When we compare rural residents to urban residents, about 67.73% of the variations in people's residence can be explained by comparing rural and urban areas. Similarly, when we compare urban areas to rural areas, approximately 37.06% of the differences in where people live can be explained by this comparison. Within rural areas, this change averages around 96.64%, and within urban areas, it's about 93.23%. The table also shows that in the entire dataset, about 74.61% of individuals have received some form of education ('Yes'), while approximately 25.39% are not educated ('No'). Just like the other categorical variables, there is some variation in educational status within individuals.

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Table 5: Descriptive Statistics for Categorical Variables

Variable	Overall		Between		Within
	Frequency	Percent	Frequency	Percent	Percent
Sex					
Male	25695	47.79	13522	47.65	98.76
Female	28077	52.21	15198	53.56	98.85
Total	53772	100.00	28720	101.21	98.81
Marital Status					
Married	16322	34.31	8281	30.91	89.75
Unmarried	31251	65.69	20260	75.61	95.57
Total	47573	100.00	28541	106.52	93.88
Locality					
Rural	31294	65.98	17015	67.73	96.64
Urban	16134	34.02	9310	37.06	93.23
Total	47428	100.00	26325	104.78	95.43
Education					
Yes	37373	74.61	21248	79.54	96.05
No	12717	25.39	7252	27.15	86.91
Total	50090	100.00	28500	106.69	93.73

Source: Computed from Ghana Socio-Economic Panel Survey (W1-W3)

Effect of Financial Inclusion and Depression

Table 6 presents the baseline fixed effect model showing the relationship between financial inclusion and depression. We performed the Hausman test and the outcome shows that the fixed effect estimates is appropriate. The results from the fixed effect estimation suggests that people who are more financially included their level of depression tends to increase. However, this association is not statistically significant. This can be attributed to the endogeneity inherent in the financial inclusion variable. We believe that apart from the fact that financial inclusion can result in a reduction in the levels of depression, depression can lead to changes in the individual's financial behavior. For instance, individuals with depression may be less likely to work, manage their finances, make prudent financial decisions, or even use financial services. This reverse causality makes it challenging to reveal the expected relationship between financial inclusion and depression.

The results of the association between baseline financial inclusion and depression accounts for a wide range of covariates which includes education, household income, location, sex, and many more. These are significant determinants of the perceived association between financial inclusion and mental health particularly depression (Gyasi *et al.,* 2019). Also, being a male is seen to have an association with depression. Thus, from the table, being a male reduces depression level by a factor of 2.345. This is consistent with the works of Girgus and Yang (2015). Additionally, the outcome portrays a significant positive association between age of an individual and depression. That is, older individuals experiences depression by a factor of 0.15. This is consistent with the works of Khesht-Masjedi *et al.,* (2019).

Table 6: Effect of Financial Inclusion on Depression (Baseline Model)

	(Fixed Effect)
	Depression
FI	0.030
	(0.0564)
hhs	0.036
	(0.0290)
Age	0.151***
	(0.0082)
household_income	0.007
	(0.0272)
Marital status	
1.Married	0.091
sex	.
1.Male	-2.345***
	(0.8784)
Education	.
1.Yes	0.098
	(0.1911)
locality	
1. Urban	0.127
	(0.2007)
_cons	18.550***
	(0.5468)
N	24475

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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The endogeneity associated with using financial inclusion as the primary indicator was eliminated using the Two Stage Least Square estimation. Table 7 shows the IV estimates from the 2SLS. The results shows a statistically significant inverse relationship between the financial inclusion-depression nexus. We can see from the table that as the individual becomes more financially included, the depression level reduces by a factor of 1.860, as expected. Furthermore, it can be seen that after endogeneity has been catered for, not only the sign has changed but also the coefficients or the magnitude of effect is higher than the baseline fixed effect model. The results also revealed that living in urban areas is associated with higher levels of depression. This assertion is in line with the works of Sampson et al., (2020).

Also, increase in household size, for instance, leads to an increase in depression. This may be attributed to the fact that economic struggles within a larger household may affect the overall quality of life, limiting access to educational opportunities, accessing medical care, etc. This imbalance between economic demands and available resources can contribute to stress and negatively impact mental well-being. The IV estimates been substantially more significant than the fixed effect estimates, suggests underestimation with the baseline regression. The number of financial institutions per region (Fininst_total) also increases with financial inclusion as it can be seen from the first stage result in the first column.

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Table 7: Effect of Financial Inclusion on Depression- IV Estimates

	(2SLS) First Stage	(2SLS) Second Stage
		Depression
FI		-1.860***
		(0.4972)
hhs	0.028***	0.091***
	(0.0045)	(0.0331)
Age	0.028***	0.086***
	(0.0013)	(0.0190)
household_income	-0.001	0.010
	(0.0055)	(0.0298)
Marital status		
1.Married	0.039	0.162
	(0.0245)	(0.1509)
sex		
1.Male	0.058	-2.160***
	(0.1008)	(0.7989)
Education		
1.Yes	0.157***	0.402*
	(0.0302)	(0.2171)
locality		
1. Urban	-0.018	0.144
	(0.0347)	(0.209)
Fininst_total	0.0023***	
	(0.0002)	
Kleibergen-Paap rk Wald F statistic: Stock-Yogo weak ID test critical values: 10% maximal IV size	16.38	16.38
N	19460	19460

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Financial Inclusion and Subjective Social Welfare - Community

This section of the chapter analyzes the connection that exists between financial inclusion and subjective social welfare. As reported in Table 8, the results from the fixed effect estimates examine the unconditional effect of financial inclusion on subjective social welfare, where subjective social welfare here measures people's perceived social status in relation to other people in the community. The results suggest that greater levels of financial inclusion correspond to an increase in one's subjective social welfare by a factor of 0.095. The results is in accordance with the works of Singh-Manoux *et al.,* (2005), Ozili (2020) and Appiah-Kubi, (2023) who also found a positive relationship between the financial inclusion-subjective welfare nexus.

This results stems from the fact that financial inclusion has been shown to increase a person's sense of empowerment and social inclusion and improve their financial stability which in turn increases the individual's subjective social welfare. The results from the table also indicate a positive relationship between household income and subjective social welfare. This makes sense because increased household income often leads to better living standards, improved housing conditions, and enhanced opportunities for personal development and growth which translates into higher subjective assessment of one's overall wellbeing. Many literature has backed this assertion of a direct relationship between income and subjective social welfare. Some of them are the works of Schneider (2019), Nolan and Weisstanner, (2022) and many more. These studies collectively underscore the idea that financial prosperity facilitates improved life conditions, affording individuals the resources and capabilities to lead more fulfilling lives.

Table 8: Effect of FI on SSW_Community

	(Fixed Effect)
	SSW_community
FI	0.095***
	(0.0359)
hhs	0.056***
	(0.0179)
Age	0.001
	(0.0048)
household_income	0.012*
	(0.0186)
Marital status	
1.Married	0.108
	(0.0885)
sex	.
1.Male	-0.183
	(0.4518)
Education	.
1.Yes	-0.162
	(0.1242)
locality	.
1. Urban	-0.629***
	(0.1287)
_cons	4.886***
	(0.3224)
N	23828

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Effect of Financial Inclusion on Subjective Social Welfare- Community-

IV Estimates

The proven association between financial inclusion and subjective

social welfare may be biased and endogenous. There is potential reverse

causality. For instance, those who think of themselves as having a better

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subjective social welfare may be more likely to be financially included than vice versa. Table 9 shows the IV estimates of the financial inclusion-SSW_Community nexus. Column 1 presents the results from the first stage regression and column 2, the second stage. As seen in column 2, higher levels of financial inclusion leads to an increase in subjective social welfare by a factor of 2.207. This result is statistically significant. Furthermore, the comparison between the fixed effect model above and the 2SLS model shows that the effect of financial inclusion on SSW_Community would have been underestimated when endogeneity is not accounted for. This stands to reason that the IV estimations are far more important than the fixed effect estimations.

The outcomes obtained from the first-stage analysis of the two-stage least squares (2SLS) regression, aligning with the anticipated pattern, demonstrate a connection between the growth in the number of financial institutions per region as an instrument and a corresponding increase in the level of financial inclusion. This finding is in accordance with expectations and is in line with the observations made by Adonu (2020). Moreover, the addition of household income as part of the control variables will help mitigate a potential concern that might temper with the instrument's validity. We believe that the validity of the instrument may be compromised by the possibility that neighbourhood factors are connected with financial institution locations. For instance, wealthy neighbourhoods are more likely than relatively poor ones to host financial institutions. If so, the projected effect may not accurately reflect how financial inclusion affect subjective social welfare but rather the effect of neighbourhood wealth.

Table 9: Effect of FI on Subjective Social Welfare- Community- IV Estimates

	(2SLS) First Stage	(2SLS) Second Stage
		SSW_community
FI		2.207***
		(0.329)
hhs	0.028***	-0.004
	(0.0046)	(0.0224)
Age	0.028***	-0.072***
	(0.0014)	(0.0129)
household_income	-0.002	0.008
	(0.0056)	(0.0225)
Marital status		
1.Married	0.052**	-0.003
	(0.0252)	(0.1056)
sex		
1.Male	0.090	-0.451
	(0.1026)	(0.4713)
Education		
1.Yes	0.161***	-0.510***
	(0.0306)	(0.1480)
locality		
1. Urban	-0.014	-0.667***
	(0.0352)	(0.153)
Fininst_total	0.0024***	
	(0.0002)	
Kleibergen-Paap rk Wald F statistic: Stock-Yogo weak ID test critical values: 10% maximal IV size	16.38	16.38
N	18868	18868

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.

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Effect of Financial Inclusion on Subjective Social Welfare - Ghana

The effect of financial inclusion on subjective social welfare is also shown in table 10, however, subjective social welfare here measures people's perceived social status in relation to other people in the nation as a whole. The results posit a negative relationship between financial inclusion and subjective social welfare. That is, higher levels of financial inclusion decrease SSW_Ghana by a factor of 0.231. The difference in signs between SSW_community and SSW_Ghana in relation to financial inclusion could be attributed to various contextual factors which may include the way individuals perceive and experience financial inclusion at different levels and/or endogeneity inherent in the variable financial inclusion.

For instance, SSW_community measures subjective social welfare at the community level, which is more localized and personal. People may feel more a part of and connected to their local community and hence consider financial inclusion to be more significant and beneficial to their well-being. However, SSW_Ghana which considers subjective social welfare at the national level, may be influenced by other general economic and social aspects that are not always consistent with a person's actual experiences with financial inclusion. This stands to reason that a person's perceived high self-esteem within their local community, driven by their net worth, may not necessarily translate to the same perception when they evaluate themselves on a national level and compare themselves to the country's elite (Appiah-Kubi, 2023).

Also, there is the possibility that within a nation, the influence of financial inclusion might vary widely by region and community. The positive coefficient for SSW_community might indicate that in certain communities,

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financial inclusion initiatives have been successful in improving people's economic well-being and access to resources, leading to a more positive subjective assessment. However, at the national level, the negative coefficient might suggests that the benefits of financial inclusion might not be equally distributed across the entire country, and some segments of the population might not perceive improvements in their subjective well-being.

Table 10: Effect of FI on SSW_Ghana

	(Fixed Effect) SSW_Ghana
FI	-0.231***
	(0.0394)
hhs	0.101***
	(0.0203)
Age	-0.029***
	(0.0054)
household_income	0.035*
	(0.0203)
Marital status	
1.Married	-0.114
	(0.0979)
sex	
1.Male	-0.794*
	(0.4809)
Education	.
1.Yes	-0.281**
	(0.1414)
locality	
1. Urban	-0.332**
	(0.1364)
_cons	5.757***
	(0.3544)
N	23774

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Effect of Financial Inclusion on Subjective Social Welfare (Ghana) - IV Estimates

Despite the fixed effect model estimates above showing an inverse relationship between financial inclusion and subjective social welfare (Ghana), the IV estimations findings demonstrate an expected positive direction between financial inclusion and subjective social welfare. The apparent contradiction between the initial observation of a negative correlation between financial inclusion and subjective social welfare (in the context of Ghana) within the fixed effect estimates, and the subsequent identification of a positive association between these variables in the second-stage analysis can be attributed to the presence of endogeneity which stems from reverse causality. For instance, those who think of themselves as having a better subjective social welfare in relation to Ghana may be more likely to have access to formal financial services than vice versa. However, the endogeneity issue was resolved by the 2SLS. In line with existing research, the first stage also demonstrates a statistically meaningful positive correlation between the number of financial institutions per region used as an instrument and the corresponding degree of financial inclusion.

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Table 11: Effect of FI on Subjective Social Welfare (Ghana) - IV Estimates

	(2SLS) First Stage	(2SLS) Second Stage
		SSW_Ghana
FI		1.271***
		(0.3220)
hhs	0.027***	0.060**
	(0.0045)	(0.0234)
Age	0.028***	-0.082***
	(0.0014)	(0.0131)
household_income	-0.002	0.033*
	(0.0056)	(0.0222)
Marital status		
1.Married	0.053**	-0.194*
	(0.0252)	(0.1073)
sex		
1.Male	0.088	-0.979**
	(0.1012)	(0.4958)
Education		
1.Yes	0.161***	-0.529***
	(0.0307)	(0.1566)
locality		
1. Urban	-0.011	-0.363**
	(0.0354)	(0.1529)
Fininst_total	0.0024***	
	(0.0002)	
Kleibergen-Paap rk Wald F statistic: Stock-Yogo weak ID test critical values: 10% maximal IV size	16.38	16.38
N	18824	18824

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Transmission Mechanism

One of the aims of this study is to examine whether financial inclusion indirectly influences depression through subjective social welfare. That is, to assess the mediating role of subjective social welfare in the financial inclusion-depression nexus. To achieve this, the last condition for mediation as outlined by Baron and Kenny (1986) was tested. Panel A shows the analysis of SSW_community, and Panel 'B' for SSW_Ghana as mediating instruments. To determine whether SSW_community serves as one of the pathways through which financial inclusion influences depression, we include SSW_community in the model. The inclusion of the SSW_community variable in the model revealed that SSW_community significantly affect depression. Moreover, the result from the structural equation model presented in Panel 'A' shows a statistically significant relationship between the financial inclusion-SSW_community nexus, consistent with literature.

The same was done for SSW_Ghana, and the findings are at odds with the collection of evidence from literature showing an adverse correlation between subjective social welfare and depression. However, the result was not significant (as you can see in Panel B). That apart, the Sobel test is statistically significant in the case of SSW_community. This according to Baron and Kenny (1986) is an indication of partial mediation of SSW_community in the financial inclusion-depression nexus. The outcomes of the indirect effects based on the Sobel approach further corroborate the mediating role of SSW_community. Specifically, RIT (Indirect Effect/Total Effect) suggests that about 3 % of the effect of financial inclusion on depression is mediated by SSW_community and RID (Indirect Effect/Direct Effect) suggests that the

mediated effect of SSW_community is about 0.027 times large. However, with SSW_Ghana serving as a mediator in the financial inclusion-depression nexus, the situation is different. The findings show that there is no such mediation.

Table 12: Effect of Financial Inclusion on Depression: Mediation Analysis

PANEL A	SSW_community	Depression	
FI	0.210***	-0.225***	
	(0.020)	(0.032)	
SSW_community		-0.028***	
		(0.010)	
var(e.SSW_community)	6.696		
	(0.057)		
var(e.depressed)	17.208		
	(0.147)		
Baseline Control	Yes	Yes	Yes
Observations	27582	27582	27582
Estimates	**Delta**	**Sobel**	**Monte Carlo**
Indirect Effect	-0.006***	-0.006***	-0.006***
	(0.002)	(0.002)	(0.002)
RID	0.027		
(Indirect Effect/Total Effect)			
RIT	0.026		
(Indirect effect / Direct effect)			
PANEL B	**SSW_Ghana**	**Depression**	
FI	-0.065***	-0.226***	
	(0.022)	(0.032)	
SSW_Ghana		0.003	
		(0.009)	
var(e.SSW_Ghana)	**8.052**		
	(0.068)		
var(e.depressed)	17.177		
	(0.146)		
Baseline Control	Yes	Yes	Yes
Observations	27515	27515	27515
Estimates	**Delta**	**Sobel**	**Monte Carlo**
Indirect Effect	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)
RID	0.001		
(Indirect Effect/Total Effect)			
RIT	0.001		
(Indirect effect / Direct effect)			

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Sub-Sample Analysis

Table 13 identifies heterogeneities in the influence of financial inclusion on subjective social welfare, where SSW is measured in relation to the community, focusing on the differences between location of residents, gender and marital status. The table provides analysis at a decomposed level based on sex, location, and marriage. The findings indicate that individuals who are financially included and fall within all the categories of being male or female, married or unmarried, and residing in either urban or rural areas perceive themselves highly in society (Nanziri, 2016; Rastogi & E., 2018; Ahmad Malik & Yadav, 2022; Appiah-Kubi, 2023). In other words, financial inclusion results in a statistically significant and substantial rise in the subjective social welfare among these groups. Similarly, when subjective social welfare is measured in relation to the nation as a whole, as seen in Table 14, financially included individuals are also likely to experience greater subjective social welfare regardless of their residence, gender, and marital status.

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Table 13: Effect of Financial Inclusion on Subjective Social Welfare (Community): Heterogeneity Analysis

SSW_community	Rural	Urban	Male	Female	Married	Unmarried
FI	1.829***	2.726***	2.319***	2.366***	2.014***	3.707***
	(0.391)	(0.586)	(0.484)	(0.505)	(0.419)	(1.117)
Fininst_total	0.005***	0.002***	0.0024***	0.002***	0.003***	0.002***
	(0.00043)	(0.00028)	(0.00031)	(0.00029)	(0.00030)	(0.00034)
Kleibergen-Paap rk Wald F statistic	123.91	50.17	62.66	57.51	76.12	21.13
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes
N	11691	6456	8583	10175	10623	6433

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 14: Effect of FI on Subjective Social Welfare (Ghana): Heterogeneity Analysis

SSW_Ghana	Rural	Urban	Male	Female	Married	Unmarried
FI	1.062**	1.720***	1.462***	1.398***	1.549***	1.875**
	(0.423)	(0.524)	(0.472)	(0.499)	(0.412)	(0.945)
Fininst_total	0.005***	0.002***	0.0025***	0.002***	0.003***	0.002***
	(0.00043)	(0.00028)	(0.00031)	(0.00029)	(0.0003)	(0.00034)
Kleibergen-Paap rk Wald F statistic	123.97	50.35	62.73	57.53	76.12	21.39
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes
N	11672	6433	8561	10151	10591	6375

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Sub-Sample Analysis: Effect of Financial Inclusion on Depression

Table 15 uncovers diversities in the effect financial inclusion has on depression, emphasizing differences among rural and urban residents, males and females and finally unmarried and married individuals. The findings exhibit a statistically significant influence within those in the urban areas, both

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gender (male or female) and also unmarried individuals. It shows that holding all other factors constant, financial inclusion has the potential to reduce depression levels among urban dwellers who are not married and of either gender. Despite numerous studies suggesting a higher prevalence of depression among females (Alibudbud, 2023; NAMI, 2012), the table's outcomes reveal that financial inclusion serves as one of the mechanisms that reduces depression among women.

Table 15: Effect of Financial Inclusion on Depression: Heterogeneity Analysis

Depression	Rural	Urban	Male	Female	Married	Unmarried
FI	-0.944	-2.450***	-1.404**	-1.628**	-0.374	-3.632**
	(0.686)	(0.803)	(0.712)	(0.721)	(0.618)	(1.498)
Fininst_total	0.004***	0.002***	0.002***	0.002***	0.002***	0.001***
	(0.0004)	(0.00027)	(0.00029)	(0.00028)	(0.00028)	(0.00032)
Kleibergen-Paap rk Wald F statistic	121.19	45.87	55.34	61.18	74.75	20.91
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes
N	11987	6680	8810	10530	10927	6690

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Effect of Financial Inclusion on Subjective Social Welfare: Financial Inclusion Componentry

Table 16 also displays the disaggregated outcome of the three indicators employed in the financial inclusion. The results from panel M shows that having a savings account significantly increase your subjective social welfare at the community level. Similarly, having access to loans and insurance has a positive effect on your subjective social welfare. However,

this is not statistically significant. Panel N also unveils the influence of the financial inclusion (FI) componentry on subjective social welfare, wherein subjective social welfare pertains to how individuals perceive themselves in relation to the nation they reside in as said earlier. The results further portrays that apart from savings account ownership all other financial inclusion componentry negatively affect subjective social welfare. That is, access to loans and having insurance can have adversely affect individual's subjective social welfare but having a savings account positively affect subjective social welfare though not statistically significant.

Table 16: Effect of FI on Subjective Social Welfare: Financial Inclusion Componentry

PANEL M Dep Var: SSW_community	Coefficient	Coefficient	Coefficient
Savings Account	0.205* (0.116)		
Loan		0.068 (0.131)	
Insurance			0.055 (0.071)
Baseline Controls	Yes	Yes	Yes
N	7627	12268	23817
PANEL N Dep Var: SSW_Ghana	**Coefficient**	**Coefficient**	**Coefficient**
Savings Account	0.049 (0.115)		
Loan		-0.983*** (0.137)	
Insurance			-0.334*** (0.079)
Baseline Controls	Yes	Yes	Yes
N	7606	12251	23763

Roust standard error in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Effect of Financial Inclusion on Depression: Financial Inclusion Componentry

Table 17 also presents the breakdown of the three indicators of financial inclusion and their effect on depression. The results from panel O show that ownership of a formal savings account reduces depression, while accounting for other variables in the model. This result offered proof in favour of a link between having a bank account and better mental health by Aguila *et al.,* (2016). This result is however not statistically significant according to the results in panel O.

The result is no different from having access to loans and having insurance which is also seen to reduce depression by a factor of 0.617 and 0.392 respectively, while accounting for other variables in the model. This assertion holds particular resonance, especially within the context of Ghana, where individuals enrolled in the National Health Insurance Scheme enjoy some healthcare benefits. The results is statistically significant. It is also prudent to recognize that obtaining loans without meticulous self-preparation or arrangement to pay back may yield adverse outcomes.

Table 17: Effect of FI on Depression: Financial Inclusion Componentry

PANEL O Dep Var: Depression	Coefficient	Coefficient	Coefficient
Savings Account	-0.666 (0.184)		
Loan		-0.617*** (0.200)	
Insurance			-0.392*** (0.109)
Baseline Controls	Yes	Yes	Yes
N	7832	12396	24455

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Robustness Checks

To further check how robust our results were, we used the Principal Component Analysis to create an index for depression. The PCA has four essential requirements for application. First, the components used to create the index should have Eigen values exceeding 1, as suggested by Kaiser (1960), Hamilton (2012), and Koomson and Ibrahim (2019). The second is, it is recommended to adhere to the 'rule of thumb' of keeping components that have cumulative percentage of 70% to 90% as proposed by Rae and Rae (2016). Thirdly, consider using screeplot, as proposed by Hamilton (2012). Lastly, employ the Kaiser-Meyer-Olkim (KMO) test as a post-estimation test, aiming for a coefficient greater than 50% to affirm sample adequacy. As it can be seen from Appendix A and B, the overall KMO value is about 0.8107 (81.07%) suggesting that the combined data from these variables has a good level of sampling adequacy, indicating that they might be suitable for conducting a factor analysis. Table 18 shows the results for the two-stage least square using the principal component to construct an index for depression. The

table shows that despite the change in magnitude, the financial inclusion-depression nexus shows an inverse relationship as expected.

Table 18: Effect of Financial Inclusion on Depression (Principal Component Analysis)

	(2SLS) First Stage	(2SLS) Second Stage
		Depression_pca
FI		-0.487***
		(0.1691)
hhs	0.029***	0.011
	(0.0046)	(0.0119)
Age	0.028***	-0.040***
	(0.0014)	(0.0069)
household_income	0.001	0.005
	(0.0056)	(0.0102)
Marital status		
1.Married	0.046*	-0.095*
	(0.0255)	(0.0542)
sex		
1.Male	0.094	-0.693**
	(0.1019)	(0.3015)
Education		
1.Yes	0.150***	-0.070
	(0.0311)	(0.0784)
locality		
1. Urban	-0.010	-0.033
	(0.0356)	(0.0767)
Fininst_total	0.0024***	
	(0.0002)	
Wald F statistic: 10% maximal IV size	16.38	16.38
N	18538	18538

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Chapter Summary

The chapter presented and discussed the results from various estimation techniques used for the study to achieve its objectives. The fixed

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effect model was used in analyzing the influence financial inclusion has on subjective social welfare and also the financial inclusion-depression nexus. The chapter began with the summary statistics and statistical description of the variables used in the study. The chapter also captured the analysis on the effect of financial inclusion on mental health (depression) as well as the effect of financial inclusion on subjective social welfare (i.e individual perceived status at the community level as well as the nation). The baseline results from the former revealed that financial inclusion increases depressive symptoms among individuals, however not statistically significant.

The latter revealed a statistically significant direct relationship in the FI-SSW_community nexus. After endogeneity has been taken care of, financial inclusion significantly reduces depressive symptoms and the positive relationship between the financial inclusion-SSW_Community nexus still holds. However, with the relationship between financial inclusion and SSW_Ghana, the baseline fixed effects estimates showed a negative relationship. That is, financial inclusion reduces subjective social welfare (Ghana). The IV estimates, however, revealed a positive association with the financial inclusion-SSW_Ghana nexus. This association is statistically significant. The chapter also provided analysis on the mediation role of subjective social welfare in the financial inclusion-depression nexus. The results revealed that subjective social welfare (community) partially mediate this effect but that of SSW_Ghana does not.

We advanced our exploration by delving into the nuanced influence of financial inclusion on both subjective social welfare and depression, dissecting the variables of gender, locality, and marital status. The results revealed that

for all groups financial inclusion is seen to reduce depression, holding all other variables constant. Similarly, financial inclusion also increases subjective social welfare among all categories. Also, we went ahead to analyze the impact of the financial inclusion components on depression as well as subjective social welfare. The results revealed that having a formal savings account, having access to loans and having insurance potentially reduces depression. Furthermore, apart from having savings account, the other two componentry of financial inclusion adversely affect SSW_Ghana. However, all the three componentry had a positive effect on SSW_community. To check for robustness of our results, we employed the Principal Component Analysis (PCA) and the result is still consistent as expected despite a change in magnitude of the effect.
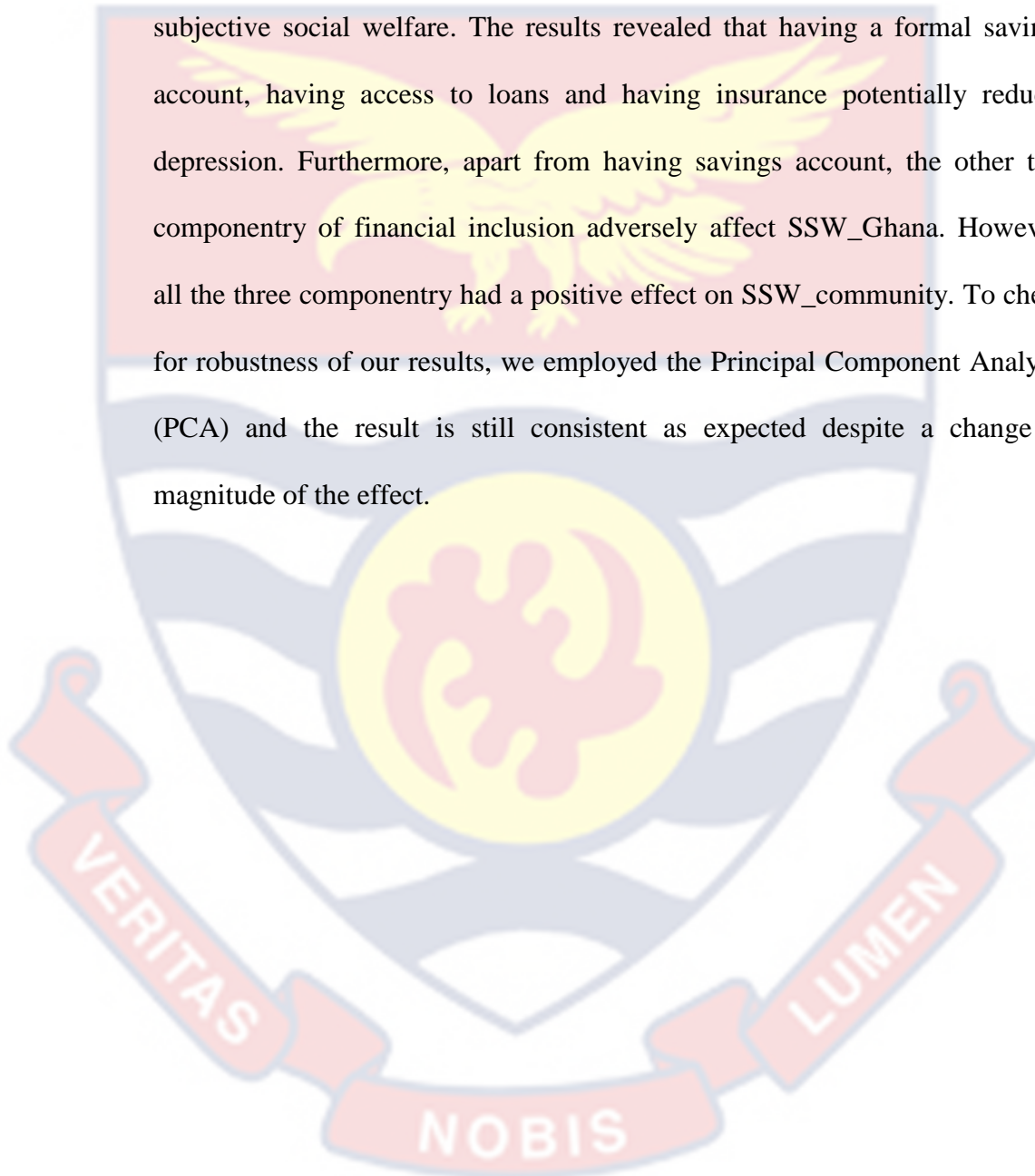
CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This is the final chapter, providing a comprehensive overview of the entire research journey, spanning from the first chapter to the fourth. Conclusions are drawn from the findings from the study. These conclusion form the basis for our recommendations to key institutions and policymakers for their effective response. Additionally, we encourage for further research in the area.

Summary

In light of the commitments made by world leaders, including the Ghanaian government, to support the realization of the Sustainable Development Goal of ensuring that people live a healthy live and promoting good well-being across all age groups, this study examined how financial inclusion affect SSW as well as mental health in Ghana. When it comes to emerging economies, there is still scant evidence demonstrating a connection between financial inclusion and its effect on subjective social welfare and mental health. As far as the researcher is aware, this work is the first to look at how financial inclusion affects subjective social welfare as well as mental health in Ghana.

The SDG 3 is targeting healthy lives and promotion of good well-being for all at all ages. This goal includes a broad spectrum of health-related targets, including and addressing mental health issues. SDG 3.4 specifically aims to reduce one-third of premature deaths brought on by non-communicable diseases by putting an emphasis on mental health promotion, prevention, and treatment. The Government of Ghana in their capacity,

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showed modest support for this goal by introducing several policies and initiative to help mitigate this concern. Despite these interventions, statistics shows that depression is still prevalent. Literature has unequivocally highlighted the advantages of financial inclusion in reducing mental health related issues (Aguila *et al*., 2016; Ajefu *et al., 2020)*. This paper sought to employ financial inclusion as a means to alleviate mental health issues (in this context, depression is employed as a substitute indicator for mental health).

Studies have also proven the positive relationship that exists between subjective social welfare and financial inclusion. However, not much has been done in the Ghanaian context. The study aimed at examining how financial inclusion affects subjective social welfare and mental health gathering data from the Ghana Socio-Economic Panel Survey. We also explored the mediation role of subjective social welfare in the financial inclusion-depression nexus. To guarantee that everyone is included, the Sustainable Development Goals (SDGs) of the United Nations foresee and encourage study analysis at the micro level of data. In light of this, the study also examined the effect of financial inclusion on both depression and subjective social welfare at a decomposed level of sex, marital status, and locality.

Theoretical review was also conducted. Theories reviewed include the Capability Approach by Amartya Sen, the Bottom-up theory of subjective wellbeing and the Health Capital Theory by Michael Grossman. Sen's Capability Approach is an attempt to conceptualise individual welfare in terms of capabilities and functionings. In relation to this study, the theory posits that financial resources and services provide opportunities to individuals to accomplish certain life goals, which he termed as 'functionings'. What

influences these 'functionings' is what he referred to as capabilities. These capabilities may include access to social security, financial services, healthcare, and many more.

This study's connection to the bottom-up theory of subjective social welfare stems from the concept contentment in distinct life domains plays a crucial role in shaping the overall subjective welfare of the individual. Grossman's Health Capital Theory underlines the idea that people might think of their health as a type of capital stock and that they invest in their health in order to increase their general well-being and productivity. Investments in health, which may include paying for medical care, purchasing insurance, and other activities, are comparable to those made in other forms of capital, such financial assets, the use of which decreases mental health related issues.

This paper reviewed a number of studies related to this subject matter across the globe. Works by Gyasi, *et al*., (2019), Munyegera and Matsumoto (2016), Sakyi-Nyarko, *et al.*,(2022), Aguila *et al.,* (2016), Wu, *et al*., (2023) and many others were reviewed. From the works mentioned above, studies on financial inclusion and mental health, revealed a negative relationship between these two variables and that of financial inclusion and welfare related outcomes showed a positive relationship. Inferring from the literature reviewed, a specific gap was identified. That is, prior studies utilized cross-sectional design which is deficient when it comes to monitoring changes over a period of time. For this reason, most studies failed to establish a causal relation instead a mere correlation.

This study sought to the use of panel design because of its ability to monitor changes over time. Specifically, secondary data from wave 1, wave 2

and wave 3 of the Ghana Socio-economic Panel Survey was used. The GSPS is a three-wave data with the first wave conducted in 2009/2010, the second 2013/2014 and the third in 2017/2018. The study also employed quantitative approach to test hypotheses (Creswell and Creswell, 2017). The study's unit of analysis was the individual, and all analysis was carried out using Stata Software version 17. The researcher specified both the empirical and theoretical model for the study in the third chapter. Objectives 1 and 2 were estimated with the fixed effect model as the baseline model. We employed the Structural Equation Model (SEM) to estimate the mediation analysis for the third objective. In chapter three, there was an exposition on how the variables were measured.

The fourth chapter began by providing summary statistics for the study's variables, and then presented and discussed the findings of the regression analysis. With the financial inclusion-depression nexus, the outcome revealed that financial inclusion increases depressive symptoms among individuals in the baseline fixed effect model. However, the result was not statistically significant. This was attributed to the endogeneity inherent in the financial inclusion variable. After endogeneity has been resolved with the 2SLS, the results significantly turned out as expected. Furthermore, with the financial inclusion-subjective social welfare nexus, both the fixed effect model and the 2SLS showed a statistically significant positive relationship. According to the findings from the mediation analysis, the connection between financial inclusion and depression is partially mediated by SSW_community. However, with SSW_Ghana, there was no mediation. The results from the decomposed level analysis revealed that for all groups, financial inclusion is

seen to reduce depression, holding all other variables constant. Similarly, financial inclusion also increases subjective social welfare among all categories.

Conclusion

The conclusions from this study have revealed that financial inclusion significantly serves as one of the channels to mitigate depression among individuals. These findings are robust to alternative specifications. The finding also reveals that irrespective of the individual's location, marital status and gender, financial inclusion has proven to reduce depression. In addition, it was revealed that financial inclusion increases subjective social welfare of the ordinary Ghanaian. The heterogeneity analysis proves that financial inclusion has an incredibly significant effect on rural and urban dwellers, married and unmarried individuals of either gender. Also, it has been established that how people perceive themselves in relation to the community they live in (SSW_community), partially mediates the influence of financial inclusion on depression. Furthermore, it was revealed that having a savings account, having access to loans and having insurance potentially reduces depression and positively affects subjective social welfare at the community level.

Recommendation

The ramifications of this study are pertinent for decision-makers. Based on the above conclusions, the following recommendations were made;

- The government, through the Ministry of Finance and the Telecommunication Industry, is advised to increase financial inclusion based on the prior conclusions. By lowering obstacles to

financial inclusion and opening up access to banking services, this can be accomplished.

- On insurance per se, the government through the Ministry of Health can ensure public-private partnership. Thus, the government ought to collaborate with the private sector, which includes private hospitals and private insurance companies, to expand access to healthcare and insurance in general. In addition, the government should make effort to establish insurance agencies in remote areas with permission to issue insurance through the Ministry of Health, rather than limiting a district to having only one or two insurance offices. This approach will streamline the insurance registration process, particularly for marginalized individuals in remote areas.

- On access to loans, we recommend putting in place a more adaptable framework with less stringent contracts and documentation requirement. Additionally, financial institutions should consider reducing the high-interest rates that deter people from borrowing. Furthermore, concerning bank account ownership, it is advisable for the central bank to mandate that all banks, including microfinance institutions and Rural Community Banks (RCBs), adopt user-friendly mobile banking platforms. These platform should be designed to be less cumbersome, enabling vulnerable individuals to easily navigate and set up accounts with financial institutions while enjoying the benefit of mobile banking. Incorporating this requirement into the operational criteria for financial institutions can be highly effective.

- From the outcome drawn from the mediation analysis, the researcher recommend that the government should implement community-based programs that empower local communities to enhance their social welfare. These programmes may be relevant to issues with financial education and job opportunities leading to the strengthening of social networks, fostering a sense of belonging and promoting community cohesion. In addition, there is the need for the Government of Ghana to expand access to microfinance institutions and credit facilities at the community level. This can help individuals and small businesses access capital, create economic opportunities, and reduce financial stress. All of these interventions contributes to the enhancement of the individual's subjective social welfare, consequently leading to a reduction in depression.

- Based on the conclusions from the heterogeneity analysis, we recommend that the Department of Social Welfare and Development, under the auspices of the Ministry of Gender, Children, and Social Protection is tasked with spearheading the integration of marginalized and vulnerable individuals into mainstream society. It must prioritize inclusivity in the financial system for all, regardless of gender, geographical location, or marital status. Also, the Ministry of Health should educate the public about potential adverse effects and causes of mental health-related issues, these endeavors contribute to building a more informed and understanding audience. This, in turn, can play a role in mitigating mental health issues.

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APPENDICES

Appendix A: **PCA for depression**

Rotation: (unrotated = principal)

Components	Eigenvalue	Difference	Proportion	Cumulative
Component 1	2.669	1.751	0.445	0.445
Component 2	0.918	0.152	0.153	0.598
Component 3	0.767	0.163	0.127	0.726
Component 4	0.604	0.030	0.101	0.826
Component 5	0.573	0.105	0.096	0.921
Component 6	0.468	-0.187	0.078	1.000

Source: Author's computation using Ghana Socio-economic Panel Survey

Appendix B: **Component matrix loadings**

Principal Component based on Eigen vector

Variable	Component 1	Unexplained	KMO
Tired	0.3849	0.6045	0.8322
Hopeless	0.4628	0.4282	0.7854
Depressed	0.4521	0.4545	0.8161
Everything Effort	0.2357	0.8517	0.8576
Nothing cheer up	0.4355	0.4937	0.8331
Worthless	0.4336	0.4982	0.7876
Overall			**0.8107**

Source: Author's computation using Ghana Socio-economic Panel Survey

Appendix C: **FI and Depression (RE and OLS Model)**

	(Random Effect)	(OLS)
	Depression	Depression
FI	-0.203***	-0.181***
	(0.0365)	(0.0363)
hhs	0.031**	-0.037***
	(0.0124)	(0.0121)
Age	0.036***	0.037***
	(0.0019)	(0.0018)
household_income	-0.032*	-0.037**
	(0.0164)	(0.0161)
Marital status		
1.Married	0.147**	0.093
	(0.0650)	(0.0628)
sex	.	.
1.Male	-0.436***	-0.420***
	(0.0596)	(0.0570)
Education	.	.
1.Yes	-1.038***	-1.046***
	(0.0743)	(0.0723)
locality	.	.
1. Urban	-0.732***	-0.765***
	(0.0634)	(0.0608)
_cons	11.380***	11.386***
	(0.1295)	(0.1270)
R-Squared		0.0692
N	24475	24475

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix D: **FI and Subjective Social Welfare- Community (RE and OLS Model)**

	(Random Effect)	(OLS)
	SSW_community	SSW_community
FI	0.135***	0.138***
	(0.0219)	(0.0220)
hhs	0.031***	0.031***
	(0.0075)	(0.0075)
Age	0.008***	0.008***
	(0.0011)	(0.0011)
household_income	0.037***	0.037***
	(0.0102)	(0.010)
Marital status		
1.Married	0.225***	0.226***
	(0.0371)	(0.0370)
sex	.	.
1.Male	0.272***	0.278***
	(0.0353)	(0.0349)
Education	.	.
1.Yes	0.302***	0.306***
	(0.0431)	(0.0426)
locality	.	.
1. Urban	0.039	0.046
	(0.0370)	(0.0367)
_cons	3.798***	3.785***
	(0.780)	(0.0775)
R-Squared		0.156
N	23828	23828

Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

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Appendix E:

FI and SSW_Ghana (RE and OLS Model)

	(Random Effect) **SSW_Ghana**	**(OLS)** **SSW_Ghana**
FI	-0.152***	-0.150***
	(0.0238)	(0.0238)
hhs	0.068***	0.067***
	(0.0084)	(0.0085)
Age	0.001	0.0004
	(0.0011)	(0.0011)
household_income	0.060***	0.059***
	(0.0106)	(0.0104)
Marital status		
1.Married	0.128***	0.129***
	(0.0403)	(0.0406)
sex	.	.
1.Male	0.123***	0.125***
	(0.0383)	(0.0383)
Education	.	.
1.Yes	0.032	0.033
	(0.0481)	(0.0480)
locality	.	.
1. Urban	0.344***	0.347***
	(0.0386)	(0.0393)
_cons	3.519***	3.511***
	(0.0870)	(0.0867)
R-Squared		0.0095
N	23774	23774

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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