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IMPACT OF DEMOGRAPHIC TRANSITION ON FINANCIAL MARKET PARTICIPATION

Bachelor's thesis
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I hereby declare that I have compiled the thesis independently
and all works, important standpoints and data by other authors
have been properly referenced and the same paper
has not been previously presented for grading.

The document length is 8,240 words from the introduction to the end of the conclusion.

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ABSTRACT

This study examines the influence of demographic factors on financial market participation and explores this relationship in various regions across the world. The study's dependent variable is financial market participation which is represented by account ownership in a financial institution or a mobile money service provider and the key independent variable is the young age demographic. GDP per capita, unemployment rate and inflation rate serve as the main control variables. The study employs a quantitative methodology and regression analysis utilising data from the Worlbank Development Indicators Database to explore the relationship between economic indicators and demographic structures and the effect they have on the level of financial market participation. The results of the regression analysis show a negative correlation between a young demographic and financial market participation, which suggests countries with a more youthful population have a lower financial market participation. This finding is however challenged by the relatively higher financial market participation in regions like Africa compared with other regions like Europe, which have an older population. The study also finds GDP per capita to have a positive and strong association with financial market participation, suggesting the importance of economic development to individuals' engagement with the financial markets. Overall, the different regions examined exhibit significantly varying participation rates when compared with each other due to their different economic and population dynamics.

Keywords: demographic transition, financial market participation, age structure, demographic factor.

ABBREVIATIONS

Financial Market Participation (FMP)

Gross Domestic Product (GDP)

Gross National Income (GNI)

Account Ownership in a Financial Institution (AOFI)

Mobile Money Service Provider (MMSP)

Human Capital Index (HCI)

Efficient Market Hypothesis (EMH)

INTRODUCTION

Demographic transition and financial market participation (FMP) are getting more emphasis since they add to the conversation about the growth of the global economy. This research is dedicated to the analysis of the association between demographic transition and financial market participation, with a specific emphasis on account ownership at a financial institution as the dependent variable while considering age structure or population structure as the trigger (Cristea et al., 2020). Moreover, Buchmann et al. (2023) stated that demographic factors such as gender, age, and urbanization are among the most significant characteristics of inequalities in the European and African population distribution which greatly affect the financial markets. On a global level, regions like European and African nations are confined by opposite demographic patterns and population features, which makes them exceptional points for exploration. European Union's uneven ageing population and old finance sector are creating a specific viewpoint of what happens to the main market participation in the context of a de-ageing society. However, Yeboah et al. (2020) demonstrated that Africa's youthful population indicate that vibrant financial activities based on the youthful population make the financial market differ from those that are based on adult populations. The fact that there are demographic and financial features that are specific to the two regions of this study impresses the value of knowing how demographics are related to the way people behave financially (Buchmann et al., 2023; Cristea et al., 2020).

Furthermore, Agyemang-Badu (2021) indicated that the function of changes in age structure breaks down when it comes to owning an account at a financial institution market. This data helps bodies such as policymakers and financial institutions because they can, in turn, use it to modify their strategies according to the changes in the demographic environment. Additionally, this research on the role of age, gender, education and citizenship status on stock market instability tests the demographic influence on financial behaviour. This work, thus, seeks to deepen insights into the causes of global financial market behaviour by looking at the links between demography and participating in the financial market (Ndou, 2023). In addition, while the age structure is accepted as having repercussions on factors such as labour strength, savings and Human Development Index (HDI), there is a widespread lack of sufficient research pointing directly to it

as an influencer for financial markets. Through this, it can be seen that the research is a different kind from the ones beforehand related to it and it is more than just an addition to the existing body of knowledge which also tries to show the effects of demographic transition on financial market participation (Bloom et al., 2010).

The study is equally about explaining the discrepancies in the level of financial market participation between Europe and Africa as well as a discussion on how demographic transition (which refers to changes in age structure, that is, the number of people and their age distribution) affects individuals' likelihood to be involved in the financial markets. Consequently, this research can be considered in combination with demographic research as well as financial market analysis, to provide relevant knowledge that acts as a basis or helps in policy making (Goyal & Kumar, 2021). Hence, the interaction model set in the study illustrates the complex relationship between demographic transition and financial market participation, thus providing a comprehensive understanding of the issue. This research, through navigating different demographic profiles, economic conditions and financial behaviours, aims to bring useful insights into the areas of economics, finance and demographics.

The purpose of this research is to fill a gap in the extant literature by examining the practical implications of demographic changes on individuals' ability to take part in the financial market, focusing specifically on the influence of age structure or age distribution on an individual's capacity to participate in the financial market by owning an account in a financial institution or a mobile money service provider in various countries. For instance, the demographic landscape in Europe is characterised by an ageing population and market participation predominantly through traditional banking systems due to historically well-established banking systems and infrastructure and the region's general financial literacy (Davis, 2006). In contrast, traditional banking does not dominate Africa's financial inclusion but is rather more focused on mobile money services. This is due to the fact that Africa's banking infrastructure is relatively not as developed and also due to the high costs that come with traditional banking systems (GSMA, 2015). As the dependent variable for this study, Account ownership in a financial institution or mobile money service provider is going to be examined for each region and look at the effects of age demography on this variable. Thus, this research has the following questions to answer:

RQ1: How does demographic transition influence financial market participation?

RQ2: Are there significant differences in financial market participation between Europe, Africa and other regions?

The proxy for financial market participation is Account ownership in a financial institution (AOFI) or mobile money service provider (MMSP) which serves as the dependent variable and the proxy for demography is the share of population below 15 years which represents the age demography and young population, the main independent variable.

The subsequent chapters of this study are organised as follows: a review of past literature related to the subject in question, the data and methodology aspects of the study and finally a third chapter that deals with the analysis and discussion of the empirical evidence. Conclusions and recommendations are made thereafter.

1. LITERATURE REVIEW

Financial Market Participation and Demographic Transition maintain an interrelated activity, serving as factors that have a great contribution to the global economic environment construction. Such a connection is particularly enhanced by division sampling of the regions of the world and looking at the interplay in these regions, for example, Europe and Africa which display different regional demographic profiles and financial market models (Žokalj, 2016). Moreover, Lee (2016) suggests that demographic transition, whereby birth and death rates drop as a country develops, has a critical role in determining participation in financial markets and individuals as well as collective investment behaviours, change in saving rates, and economic growth improve in a region with time. However, Kelley (1988) stated that in a place like Europe, with its well-aged population as the truth of the case, the economic transition might raise an obstacle to participating fully in financial markets. The continent's developed financial markets, as well as the implications of a population trend towards being predominantly older in the future, demand a profound comprehension of how ageing impacts how people invest, their risk tolerance and what kind of financial product they would like to engage with.

Furthermore, Lee and Mason (2010) indicated that other places like Africa, with its bright picture which is supplied by a very young demography and increasing financial market activities, show that there exists a completely different viewpoint. A young population can have all the more reasons for assuming higher risks with more market participation even though it happens within a developing financial infrastructure and a vast range of levels of financial knowledge among citizens. The research by Kirk (1996) demonstrated that awareness of the substantial influence of demographic factors arises from population changes in the financial market performances. The findings from the mentioned research undertakings confirm that labour force participation, savings, and the Human Development Index, which indirectly affect financial markets, are significantly influenced by age structure and distribution. In this regard, Bloom et al. (2010) indicate that age structure(young and old ratio), needs to be considered when dealing with economic variables such as labour strength participation and savings, as they all play a crucial role in determining activities in the financial market. The demographic transitional change caused by

this market as well is another reason for the differentiation between regions like Europe and Africa in financial market participation and get the outlook from these various regions around the world. The European finance market reflects the older age groups who prefer to put aside and invest in less risky options like saving, which are thought to guarantee retirement and future security. However, Mason & Lee (2007) examined that Africa's younger population is creating more youth engagement and larger participation in equities and high-risk financial products, with a longer investment horizon as well as a growing need for financial services that cater to the young, energetic populace. Hence, links between demographic transition and financial market participation underscore awareness about the demographic profiles of the respective regions. This knowledge is dedicated to policymakers, investors and financial institutions whose plans are geared towards captivating the skill of adjusting their plans to accommodate the change in global demographic trends. This way, only long-term financial market stability can be attained (Eastwood & Lipton, 2011).

1.1. Background Discussion and Terminology

The study of Financial Market Participation and Demographic Transition involves a background context and the definition of terms which help understand the fascinating correlation between population shifts and the involvement of financial markets (Kuizheva & Prigoda, 2019).

Demographic transition: This term refers to the replacement of high levels of births and mortality by lower ones as a social structure progresses over time. This shift is becoming more relevant due to its impact on financial market participation. Demographic transition occurs in different stages in the course of time. The pre-transition stage is characterised by high birth rates and this stage can be seen in countries that have not yet had industrial revolution, so these societies rely on high birth rates to provide labour for farming and other agricultural purposes (Wilson, 2013). The next stage, early transition, has a lower death rate due to better sanitation and healthcare but the population and birth rates remain high due to economic factors and large families being part of the cultural norm (Delventhal & Fernandez-Villaverde, 2022).

As societies process in the level of industrial revolution, the latter stages of demographic transition, late transition and post-transition, are reached. These are characterised by low birth and death rates as a result of improved healthcare and sanitation, urbanisation, access to contraception and higher

levels of education as well as smaller family sizes (Wilson, 2013). This evolution of demographic trends affects various aspects of the population and how they engage in the financial market. In the context of this study, it concerns peoples' participation in investment, saving and performing other financial transactions in the financial market (Canning et al., 2015).

Financial Market Participation (FMP): The term refers to the participation of individuals as well as institutions in the financial market, where they take part in activities such as investing in stocks, bonds, and other financial instruments (Filipov & Dorbritz, 2003). Therefore, participation of the international financial markets in such a process is one of the major factors which are also influenced by demographic variables like age structure and population dynamics. On the other hand, this characteristic is closely linked to the demographics of the region. For example, in the Americas, it is recorded that the stock market is a major aspect of investment when it comes to participating in the financial market with about 61% of adults invested in the stock market in the United States as of 2023. On the other hand, Europe also has a robust banking and financial market system with a big focus on capital markets across the borders of the European Union (International Monetary Fund, 2019). Advanced economies in Asia like South Korea and Japan also have a thriving financial market participation level and have seen rapid growth across the region in recent times due to economic growth and improved strategies that allow accessibility to financial market instruments (Asian Development Bank, 2009).

One thing that allows for FMP is the economic policies put in place by various institutions of countries. Economic and institutional factors that governments and central banks encourage can be either positive or negative to how people engage with the financial system of their country. For example, higher interest rates from banks push investors away and lower rates attract engagement in the stock markets because people are always looking for high investment returns. Regulations that governments implement can also be either attractive or repulsive to investors or individuals seeking to make some returns or engage with financial tools. Countries with regulations that protect investors allow their citizens to feel safe when participating in the financial market as this ensures the security of their hard-earned money and they are also more likely to take more risks if need be when it comes to investing.

The research by Poterba (2004) articulated and compared the demographic patterns and economic prospects of Europe with those of Africa. The European countries having an ageing populace and advanced financial sectors as the case demonstrate how these events influence the volume of

market participation of developed countries. However, Piggott & Sane (2012) stated that the African youthful population and emerging sophistication in the sector point out a contrasting opinion on how demographics could influence money management in these regions. This encouragement is a starting point for a thorough study that focuses on the influence of demographic transition on financial market engagement in a set of diverse country lines. The study can be centred on the investigation of the shaping forces of demographic changes on financial markets in regions with starkly different outlooks like Europe and Africa and can aim to provide vital insights into the processes which drive the behaviour of individual people in the international markets (Imam, 2013). This is believed to contribute towards a better understanding of the evolving nature of the relationship between demography and financial behaviour.

1.2. Financial Theories

An understanding of how the population makes financial decisions and interacts with financial markets can be gained by exploring financial theories. These theories provide insights into the factors, mostly psychological, that influence market participation and investor behaviour. Some of the common financial theories to explore are Financial Literacy Theory, Behavioural Finance and Efficient Market Hypothesis.

The Financial Literacy Theory suggests that an individual's understanding and knowledge of financial concepts, products and services ensure that they can be more financially responsible and make informed financial choices and decisions in the financial markets. Such theory has a strong point in the realm of financial education because it is the basis for people's ability to save, invest and engage in other actions that require financial decision-making. Consequently, people can readily understand the behaviours of financial markets and products when they command financial market dynamics and products. Thus, they would easily coordinate the complexities of financial planning, risk assessment and wealth building (Lusardi & Mitchell, 2011).

Financial Literacy is one of the keys which helps to grasp how demographic changes lead to financial market participation. Demographic transition, containing the distinction in age format, fertility rates, and mortality, has as a consequence, those economic and financial behaviour disparities among various regions. These changes in the economic framework demand labour force

participation, savings rates and financial market as associated with Bloom, et al (2010). Regions like Europe are facing the problems of an ageing society and the financially developed sector that goes with it. Therefore, the issue of keeping the market in an active state could be seen as a challenge ahead of it. The ageing population prefers savings and is known for its conservative investment methods; it is apprehension that they do not want to lose their life savings or do not have a safe financial future (Kopecky & Taylor, 2022).

The contrary dimension is Africa's youthful population and vibrant financial market which could be the magnificent outlook of the countries with increased risk-taking and strong engagement from the market. Europe and Africa having different demographic characteristics and economic conditions provide a good background for understanding the influence of demographic transition on financial market engagement (Bloom et al., 2003). Financial Literacy Theory serves as a groundwork for better understanding the particular characteristics of local financial markets where the inhabitants could interact with them differently. In Europe, financial education among the elderly can address issues relevant to their country such as having a clear grip on retirement saving products, government bonds, and low-moderate risk investment goods which are some of the options they are faced with in today's economies (Fornero et al., 2012). Whereas in Europe financial education as embedded into the education can be focused on budgeting, saving, housing, investment, and debts, in Africa it should be rather oriented on entrepreneurship, stock market investment, and high-risk financial products that are appropriate to young investors who have a long investment horizon and different attitudes to risk (Demirgüç-Kunt et al., 2018).

On the other hand, another relevant financial theory is Behavioural Finance which focuses on the psychological aspects of influences on investors which subsequently affect the markets. The theory highlights how emotions and biases lead to irrational decisions which goes against the conventional notion that investors are rational actors. For example, a common behavioural bias as described by the disposition effect is when investors hold on to losing investments longer than they should and sell winning investments too quickly which is caused by the pain of incurring losses and the premature excitement or satisfaction of realising gains (KaplanFinancial, 2021; Investopedia, 2021).

Moreover, behavioural finance posits that these investor biases are predictable and systematic which leads to the repetition of the same behaviour and patterns associated with market efficiency and investor error. By recognising these effects and patterns individuals and investors at large can

be mindful of their actions and potentially reduce some of the negative effects of these biases. For instance, acknowledging and being aware of overconfidence can make investors stop and think and be mindful of their assumptions as well as diversify their portfolios to mitigate risk rather than relying solely on their judgement (Investopedia, 2021; The Motley Fool, 2021).

The next financial theory to look at is the Efficient Market Hypothesis (EMH). According to this theory, stock prices reflect all available information, which makes it hard or even impossible for investors to consistently outperform the market through timing and stock picking. This is because EMH posits that all important information has already been absorbed into the stock value and any fresh information leads to random fluctuations that are unpredictable (Forbes, 2022). This hypothesis would suggest that passive stock investments like investing in index funds are a more effective strategy than active fund management which seeks to beat the market. This theory has however faced some criticism that point out that market inefficiencies do occur due to irrational behaviours and human emotions. Moreover, previous studies by Rossi and Gunardi (2018) posit that markets come with irregularities and anomalies and markets may not be fully efficient, a phenomenon that cannot be fully explained by EMH.

Other notions that are associated with financial market participation include psychological and social factors. These may include biases related to behaviour like risk aversion, loss aversion, overconfidence and herd mentality. Risk aversion refers to individuals' fear of taking risks and preferring certainty over uncertainty as they engage in investment. Loss aversion, as the name suggests, deals with the behaviour of people trying to avoid losses rather than making equivalent gains. This is due to the psychological idea that the feeling of loss is more painful than the feeling of pleasure or excitement when considering equivalent wins and losses. Overconfidence also plays into the psychology of participating in the financial markets. This defines how one perceives oneself as having more knowledge, skills and predictive power than one actually possesses (Scribbr, 2023). This plays out in financial market participation in terms of how individuals approach the way they engage with financial instruments and choose what they feel will offer them the best outcome based on what they think they know by having excessive faith in their abilities and believing that they know more than others on the financial markets (Moore & Healy, 2008). On the other hand, herd mentality is defined as wanting to conform to what others in one's environment are doing. In terms of participating in the financial markets, this entails choosing the same financial instrument and investment strategies as others (The Decision Lab, 2024).

With these financial theories in view, how demographic transition affects participation in the financial market is better understood. This type of understanding shows sensitivity to demographic issues, which means that individuals can adapt the various financial theories to their specific economic realities. They become better positioned to engage in financial markets to contribute to economic growth and stability of the economy regardless of their location - be it developed or developing countries.

1.3. Hypotheses Development

The relationship between demographic changes and economic effects has firmly established a line of research, forming the basis for the fully-fledged understanding of the long-run effects of population dynamics (Bloom et al., 2010). However, Ndou (2023) articulated that a review shows that the literature excludes a significant aspect of the psychological changes that occur in stock markets when it deals with financial market participation. The exclusion of crucial understanding not only limits the in-depth comprehension and the range of practical policies to enhance market inclusivity and stability in various regions but also restricts the inputs that can be introduced for policy formulation.

Moreover, Bawazir et al. (2020) indicated that modern demographic transition affects the equities market which is evidence for the need for further investigation of the relationship between the two, especially when comparing regions with different demographic profiles and different economic backgrounds. Europe's population grows older with each passing year with a well-established traditional financial and banking system which is considered a reliable and conservative sector. However, Girón et al. (2021) contend that Africa enjoys a young and growing modern financial sector in contrast with that. There are some completely different dynamics at play. The diversity of demographic and economic trends among these regions makes it hard to pinpoint the factor of age structure on engagement in financial markets. Furthermore, Chang et al. (2020) stated that most of the current research uses the demographic transition effect on the economy and society as the main focus, where financial market concerns are considered second, if not far behind. This gap implies a significant part of research that has to be explored, taking into consideration global financial integration where the issue of inclusive financial systems becomes more important than previously.

The purpose of this research is to understand market dynamics as the fundamental element of the global financial market by assessing the level of individuals' ownership of accounts in a financial institution and performing various financial transactions that come with that. This is done by resolving the underlying aspects of the demographic effect on market participation that aims to enrich the existing theories and help with constructing nationwide or targeted policies. Hence, this research aims to increase the observed relationship between demography and financial behaviour addressed by putting the demographic factors under the lens, thereby, illustrating the complex interactions. It aims at supplementing the existing theories demonstrating the role of demographic changes (such as age structure), which positively or negatively affect individuals' participation in the financial markets. Therefore this study will focus on the following hypotheses:

H1: The share of the young population in a country is negatively correlated with the share of financial market participation.

H2: Financial market participation differs significantly between Europe, Africa and other regions.

2. DATA AND METHODOLOGY

To ensure a successful research endeavour, there is a need to have a robust foundation of data and methodology. Data is the fuel and raw material that the study needs in order to move forward. As posited by Creswell (2014), data gives researchers the measurements and observations that allow them to answer their research questions. On the other hand, methodology is the approach that is carefully designed as a blueprint to guide data collection, its analysis and interpretation (Punch, 2020).

As data and methodology are the cornerstone of any robust academic study ensuring the dependability and credibility of the findings of the study, their importance cannot be overstated. High-quality and carefully-collected data through the right means enables researchers to carry out a study and draw conclusions that have limited bias, if any, and helps others to also replicate such findings. On the other hand, poor-quality data and flawed methodologies can cause bias and lead to misleading findings and unsubstantiated conclusions which can, in effect, slow down the progress in knowledge advancement in a particular discipline (Sekaran & Bougie, 2016).

The type of methodology chosen determines the data collection and analysis. This comprises decisions about what the scope of the research is and what or who will be part of the research (sampling), research design and the tools that will be used for analysis (statistical software etc.). A methodology that is well-defined promotes transparency and enables readers and reviewers to assess the research process, evaluate the validity of conclusions and findings and determine other avenues where the findings of the study may be applicable (Yin, 2018). As such, data and methodology help researchers transform speculations from research questions into evidence-based and substantive knowledge, paving the way for further research and advancements.

2.1. Data

This study utilises a secondary data source, the World Bank Development Indicators Database, to gather data. This database provides a reliable, comprehensive and extensive collection of quantitative data retrieved from national databases and statistical institutions of the relevant countries based on various development indicators for a great number of countries around the world, which ensures solid and comparable data across the chosen regions of the study (Demirguc-Kunt et al., 2017)

The data includes the dependent variable of the study, Account ownership at a financial institution/mobile money service provider. This indicator encompasses the financial market participation rate in a country of the proportion of the population aged 15 years and over who have an account with a formal financial institution or make use of a mobile money service. For the primary independent variable, data for the Share of the population below 15 years is included in the data. This variable reflects the stage of demographic transition in a country. As this is the proxy for the stage of demographic transition, countries with a higher percentage of people below 15 years of age indicate an earlier stage of demographic transition and countries with a lower percentage are indicative of a more advanced stage in the transition. Besides the primary independent variable, the data also incorporates a number of controls and other independent variables. This is to account for confounding factors that might impact financial market participation. These include the natural logarithms of Gross Domestic Product (GDP) and Gross National Income (GNI), Unemployment rate, Inflation rate, and Literacy rate.

Table 1 shows the descriptive statistics of the dependent variable and the main independent variables for all countries. Multiple regression models are run later on in the regression analysis sub-chapter.

Table 1: Descriptive Statistics - All countries (Dependent variable is AOFI/MMSP)

Variable	Mean	Median	S.D.	Min	Max
AOFI/MMSP	57.6	55.3	30.1	0.400	100
Unemployment rate	8.02	6.36	5.95	0.140	35.3
Inflation rate	5.98	3.37	17.3	-1.54	359
GDP per capita	8.87	8.82	1.48	5.40	12.4
GNI per capita	8.65	8.55	1.41	5.58	11.6
Share of pop. below 15 years	27.3	25.4	10.6	11.7	49.7

Source: Author

2.2. Methods

The study adopts a quantitative approach and for data handling and analysis, a two-software approach is implemented. For the purpose of data preprocessing and cleaning, Microsoft Excel is the primary tool of choice (Hair et al., 2019). The dataset is retrieved from the World Bank Development Indicators Database which comprises all countries of the world as made available by the database. This is downloaded in Excel format and preprocessed accordingly. Excel is chosen because of its user-friendly and robust features for data management. As the quality of data is essential for a quantitative study, it is paramount to clean data and rid it of inconsistencies and errors to avoid flawed results and misleading conclusions (Hair et al., 2019). As such in this study, Excel helps in cleaning and preprocessing the dataset to ensure it is correctly prepared for running regressions in Gretl.

For regression analysis, Gretl is used to find coefficients, standard errors and significance levels to help determine the relationship between the variables of interest. As a statistical tool, Gretl offers a comprehensive feature set for econometric analysis and regression modelling which ensures a reliable and accurate estimation (Gujarati & Porter, 2009).

2.3. Regression Analysis

Regression analysis is a technique in statistics and econometrics that examines the factors that influence the focus variable of a study. It enables researchers to quantitatively determine the association between a dependent variable and one or more independent variables. This reveals the influence of each individual independent variable or the combined impact the independent variables have on the dependent variable.

For running regression models for this study, the impact of demographic transition, as represented primarily, for the purpose of this study, by the share of the population below 15 years (main independent variable), on financial market participation (measured by account ownership in a financial institution or a mobile money service provider (AOFI/MMSP)) is investigated. The primary independent variable is based on the definition of the young demography of a country where, according to the available data, the share of the population below the age of 15 represents the young demography in the country's age distribution. In addition to the primary independent

variable, other confounding variables such as unemployment rate, inflation, gross national income (GNI) per capita and gross domestic product (GDP) per capita are controlled for. The regression model utilises the Ordinary Least Squares regression according to the multiple regression relation below:

$$\mathbf{AOFI/MMSP = a + b_1X + b_2X^2 + ... + b_nX^n} \quad \mathbf{(1)}$$

Where;
AOFI/MMSP is the dependent variable.
a is the constant value of Y where all independent variables are zero (intercept).
$b_1, b_2, \ldots, b_n$ are the regression coefficients.
$X, X^2, \ldots, X^n$ are the independent variables related to demography

Multiple regression allows for the simultaneous analysis of the impact of multiple independent variables on the dependent variable, unlike simple linear regression which allows for only one independent variable. To control for other variables, the coefficients ($b_1, b_2, \ldots, b_n$) help to isolate the true effect of each variable. They represent the effect of each independent variable on AOFI/ MMSP while holding all else constant. The regression models in the study implement Heteroskedasticity-robust standard errors, variant HC1 for the purpose of accounting for the issue of heteroskedasticity. If not accounted for, heteroskedasticity may cause inaccurate inferences and biased standard errors. Missing or incomplete observations in the dataset are dropped from the analysis. The preprocessed dataset comprises data for the years 2011, 2014, 2017 and 2021 for countries in all regions of the world to access the overall worldwide effects of demography on financial market participation and multiple models are created with the independent variables GDP per capita, GNI per capita, Unemployment rate, Inflation rate and the share of population below age 15.

3. EMPIRICAL RESULTS

To begin with, preliminary regression models are run in Gretl to test how different variables are associated with the dependent variable. This informs the choice of variables that are used in subsequent models and which ones to exclude. After that, the main specifications are run; a regression model is created for all countries and all years in the dataset with year-fixed effects and then running separate regressions for each year. Subsequently, another model is created to investigate the relationship between the variables within three subsets of regions in the dataset. Finally, to examine further effects of geography, another regression model is run with groups of countries included as binary variables.

For the first model as seen in Appendix 1, a regression is run using observations 1-868 (n = 21) for the dependent variable against unemployment rate, inflation rate, GDP per capita, human capital index (HCI), literacy rate, and the primary independent variable, the share of population below age 15. Among these variables, literacy rate and share of population below age 15 had coefficients that are statistically significant, meaning they have a significant impact on AOFI/MMSP. With coefficients of -1.19 and -2.17 for literacy rate and share of population below age 15 respectively, this shows a negative association between these variables and the dependent variable. The model had an R^2 of 0.78 which is indicative that the independent variables explain about 78% of the variation in the dependent variable, with an adjusted R^2 of 0.69 which suggests that the model is a good fit for the data.

The second model (Appendix 2) has unemployment, inflation, GDP per capita, HCI and the share of population below age 15 as independent variables. The model has observations 1 to 868 (n = 106). GDP per capita has a statistically significant p-value with a coefficient of 10.65 which indicates a strong relationship with the dependent variable. As suggested by the R^2 value, 75.8% of the variance in financial market participation is predictable by the independent variables.
Model 3 (Appendix 3) uses observations 1 to 868 (n = 91), with missing or incomplete observations dropped from the analysis. The independent variables of interest in this model are

unemployment rate, inflation rate, GDP per capita, GNI per capita, HCI, labour force, and share of population below age 15. The model's R^2 and adjusted R^2 are 0.75 and 0.73 respectively. There are no statistically significant associations with the dependent variable except for GDP per capita with a significance level of 0.0001, indicative of a strong relationship with the dependent variable. HCI, however, has a low significance level and a moderately strong positive association with financial market participation.

Human capital index (HCI) also indicated a positive correlation but showed no statistical significance in relation to financial market participation. Literacy rate, along with HCI, is however dropped in subsequent models in the regression analysis as it has limited data points in the dataset to meet this research's purposes. GNI per capita is also dropped from subsequent models due to collinearity with GDP per capita (the model for results affected by collinearity between GDP and GNI is shown in Appendix 3).

The fourth model includes GDP per capita, unemployment rate, inflation rate and the share of population below age 15 as independent variables with a sample of 405 observations. To control for any time-related effects that might have an impact on the dependent variable, dummy variables for the years 2014, 2017 and 2021 are included in the model and then the model is run against the dependent variable, AOFI/MMSP. The results of the model indicate that the share of population below 15 years and the country's GDP per capita are statistically significant in predicting financial market participation with both variables showing a negative and positive relationship respectively with the dependent variable. The dummy variables for the various years also show statistical significance which is indicative of variations in AOFI/MMSP across different years. Additionally, the model also achieves a good fit with a 0.75 R^2 value as the independent variables included in the model explain approximately 75% of the variability in the level of market participation. The results are shown in Table 2 below.

Subsequently, a fifth model was created with the same variables for the individual years in the dataset. i.e., 2011, 2014, 2014, and 2021. The data for 2011 achieved an adjusted R^2 value of 75% and a statistically significant relationship between AOFI/MMSP and GDP per capita and the share of population below 15 years. A similar result is replicated in the year 2014 with the share of population below 15 years having a statistically significant negative relationship with AOFI/MMSP and GDP per capita having a statistically significant positive relationship with AOFI/MMSP. The model also shows a good fit with an R^2 value of 72%. Additionally, the model

for the years 2017 and 2021 confirmed the results for the previous years by replicating the same association between AOFI/MMSP and GDP per capita and the young demography represented by the share of population below 15 years. Inflation rate in the year 2021 also had a statistically significant relationship with the dependent variable. Table 3 below shows the results for each year examined.

Table 2: Regression Model 4 (Dependent variable is AOFI/MMSP)

	Model 4		
Variables	Coefficient	Std. Error	
Const	-56.46	11.08	***
Unemployment	0.01	0.13	
Inflation	0.18	0.09	*
GDP per capita	14.07	0.87	***
Share of pop. below age 15	−0.71	0.13	***
year_2014	7.03	2.21	***
year_2017	12.57	2.10	***
year_2021	16.18	2.30	***

Source: Author; Modelled in Gretl

Furthermore, separate models were run by filtering out countries from each region of the world to account for regional differences in the interplay between demography and FMP (See Figure 1). The regions were divided into Africa, Europe and other countries that are in neither Africa nor Europe for all years in the dataset. Regression results for countries in the region of Africa showed that inflation rate had a significant effect on FMP although unemployment rate didn't show any significant effect. GDP per capita and the young demography showed a moderate significance level and were positively and negatively correlated respectively with AOFI/MMSP. Adjusted R^2 value in this case was 44%. The results for European countries showed that GDP per capita and the population's young demography have a statistically significant relationship with AOFI/MMSP although unemployment and inflation rates had no significant effect on AOFI/MMSP. The R^2 value also showed a good fit with an adjusted value of 71%. In addition, other countries that are neither Europe nor Africa showed a similar result as European countries with GDP per capita having a significant impact on FMP in the positive direction and the share of population below 15 years having a significant negative correlation with FMP.

Figure 1: Relationship with dependent variable (AOFI) within each region

Africa			
Variables	*Coefficient*	*Std. Error*	
const	6.64	41.60	
Unemployment rate	−0.22	0.53	
Inflation rate	0.23	0.06	***
GDP per capita	9.54	3.94	**
Share of population below 15 years	−0.97	0.41	**
Europe			
Variables	*Coefficient*	*Std. Error*	
const	−58.84	14.59	***
Unemployment rate	0.32	0.18	*
Inflation rate	−0.05	0.12	
GDP per capita	16.80	1.46	***
Share of population below 15 years	−1.71	0.35	***
Other countries (ex. Africa and Europe)			
Variables	*Coefficient*	*Std. Error*	
const	−19.78	20.34	
Unemployment rate	−0.29	0.28	
Inflation rate	0.23	0.31	
GDP per capita	12.56	1.65	***
Share of population below 15 years	−1.38	0.25	***

Source: Author's regression models

Finally, to have an overview comparison for the various regions, a final model is run by incorporating binary dummy variables "country_africa" and "country_other" to represent countries in Africa and countries in neither Africa nor Europe respectively, using Europe as the base category for comparison. All other independent variables remain the same. The results showed that GDP per capita and the young demography continued to have a significant impact on AOFI/MMSP. Unemployment and inflation rates remained statistically insignificant in relation to FMP. The positive coefficient of country_africa suggests that on average, countries in the region of Africa have a higher participation rate than in Europe whereas the negative coefficient indicates that countries in neither Africa nor Europe have a lower market participation rate on average. Appendix 4 shows the model and values thereof.

Table 3: Regression models for year-on-year analysis (Dependent variable is AOFI/MMSP)

	2011			2014			2017			2021		
Variables	*Coef*	*Std. Error*		*Coef*	*Std. Error*		*Coef*	*Std. Error*		*Coef*	*Std. Error*	
Const	−94.70	21.59	***	−51.41	23.86	**	−40.14	19.05	**	19.23	20.03	
Unemployment	0.18	0.25		−0.08	0.24		−0.08	0.23		−0.33	0.39	
Inflation	−0.04	0.19		−0.06	0.63		0.10	0.38		0.29	0.11	***
GDP per capita	17.77	1.78	***	14.59	1.84	***	13.32	1.49	***	8.90	1.53	***
Share of Pop. below age 15	−0.52	0.22	**	−0.76	0.26	***	−0.55	0.22	**	−1.11	0.34	***
N	102			109			109			85		
R^2 adj.	75%			75%			74%			66%		

Source: Author; Modelled in Gretl

Note: * for $p < 0.1$, ** for $p < 0.05$, and *** for $p < 0.01$

The regression analysis involved varying models at play and offered an indepth look into the factors influencing the dependent variable, AOFI/MMSP. It is worth noting that the models had differing sample sizes in accordance with the available dataset and dropped some variables whose data points were too limited to have a considerable impact on the purposes of this study. Notably, literacy rate in the first model has a negative correlation with financial market participation which might be surprising at first glance but actually aligns with previous literature suggesting the negative relationship between literacy rate and market participation as countries with a higher literacy rate tend to have a lower level of financial market participation (Lusardi & Mitchell, 2011). Although this notion is contrary to popular belief, Lusardi & Mitchell (2011) showed that being financially literate does not guarantee market participation. Being financially literate, however, does ensure the knowledge and skills related to managing personal finance and financial markets in general.

Subsequent findings through all the models show that GDP per capita has a strong relationship with FMP. This goes to emphasise the idea that countries with a high economic output tend to have more thriving participation in the financial markets. Willekens (2014) indicated that countries with high economic development have more resources that allow access to financial markets, hence increasing participation. The findings also show that a young demography is negatively correlated with FMP. This aligns with previous literature that suggests that due to low economic independence, the youthful share of the population can have reduced engagement with financial markets (Willekens, 2014). Thus, a youthful population in general may be a sign of a lower FMP. Also, the year-on-year analysis for the individual years showed the evolution of the relationship between FMP and the independent variables, GDP per capita and the share of population below 15 years. The correlation between the variables remained fairly stable across time and showed how intricacies brought about by varying economic and demographic factors impact FMP in various countries.

The final model provided a finding which suggested that when accounting for the various demographic and economic variables in each country, African countries have a considerably higher FMP compared with their counterparts in Europe and other parts of the world. Europe also has a higher market participation compared with other parts of the world besides Africa. This revelation may seem intriguing at first glance but when the financial structure and age demography of Africa is put into consideration, it makes sense. Conventionally, the younger demography is not expected to have a high financial market participation rate but the innovative financial tools and mobile

money services being adopted in the region of Africa challenge that view (Andrianaivo & Yartey, 2009), as the youthful population in the region are ramping up market participation numbers by way of MMSP (McKinsey & Company, 2022).

This study's results provided a deeper understanding of the complex nature of the factors that predict people's engagement in the financial markets. Economic development as measured by GDP was shown to contribute strongly to how the population responds to and participates in dealings of the financial markets. A youthful population has also been shown to be negatively correlated with FMP although other confounding factors may produce results to the contrary as seen in this study. The analysis and results therefore highlight key aspects of what contributes to FMP and financial inclusion in countries around the world.

CONCLUSION

The results of conducting this study to explore the impact of demography on countries' participation in financial markets have yielded insightful knowledge that can help to navigate the complexities presented by the interplay between demography and FMP. The models created from the dataset allowed us to get an overview of the concept of individuals engaging in financial activities via financial institutions or mobile money service providers. As the various regions of the world were put under the lens, we saw a clearer picture of which variables to look at when looking to predict FMP and allow financial policies and strategies to evolve accordingly. The economic variables focused on in the regression models revealed how they are correlated with each other and FMP in the context of the varying economic and demographic environments of the different regions examined.

The results showed how important GDP per capita is when it comes to people's participation in the financial markets. This illustrates that a country's economic development is crucial to the promotion of market participation as this also aligns with the literature citing that a highly economically developed country has a high correlation with the population's engagement with financial products which fosters financial inclusion. Moreover, we also saw that the analysis revealed a strong negative correlation between a country's young population and FMP, which means countries with a higher youthful population will, on average, have lower participation in the markets, other confounding factors notwithstanding. This fact hints at the clue that as a country progresses in its demographic transition, it is paramount for the country's stakeholders to seek to address the issues facing the younger population and mitigate any obstacles hindering their access to financial inclusion and participation in the financial markets. This could come by way of implementing educational initiatives or providing incentives that drive FMP in the young population.

Furthermore, the results also featured what happens to the various economic and demographic factors and the impact they have on FMP in the course of different time periods. As the year-on-

year analysis suggested, the independent variables have a slightly different effect on the dependent variable across different years. As it is difficult to accurately pin down the exact predictors of market participation, this variation in the effect of the variables on FMP goes to emphasise the complex nature of the relationship between a country's participation in the financial market. To ensure the sustainability of financial inclusion and market participation, stakeholders should have this in mind when devising strategies and policies that affect their citizens' participation in the financial market.

Moreso, as we went into this study with conventional beliefs about which regions may have a higher participation in financial markets, some other confounding factors have revealed those views may not always be the reality of the matter. We saw in the analysis that when controlling for GDP and the young demographic of the population, the regions of Africa on average have a higher participation rate than European territories and then after that, other regions of the world. However, the same economic factors affect FMP quite similarly in all the regions, considering economic development by way of GDP and the young demography of the country's population. As it was revealed that a younger population should have a lower participation in the financial market, we saw a converse situation in the region of Africa which has a high young population but a practically higher participation in the financial market. This, however, is by way of predominantly mobile money services adopted by the region which make it exceptionally easy for a holder of a phone number to conduct financial transactions without any barriers caused by stringent traditional financial systems.

It is therefore safe to conclude that the study has answered its research questions of whether demography has an impact on financial market participation and if there are significant differences between various regions of the world when it comes to participating in the financial markets. The results shed light on the key demographic factors that impact market participation, that age structure has a significant impact on FMP and economically, GDP's effect on FMP cannot be overstated. The different regions also showed significantly varying participation rates when compared with each other due to their different economic and population dynamics. The study's hypotheses have been confirmed positively that yes, demographic transition does have an impact on FMP and there are significant differences in FMP levels in different regions of the world.

That said, it is essential to mention some limitations encountered by this research. The study was conducted using data from the World Bank Development Indicators database which is a secondary

data source. While this institution is considered a reliable source of data, there may still be inherent biases and limitations that come with a secondary data source such as this as ultimately the data is gathered from the various institutions in different countries and its reliability depends on the reliability of the country of origin's national databases and statistical institutions. Additionally, the dataset had a number of missing entries which narrowed down the analysis to only a few periods in time and ultimately resulted in reducing the sample size in the regression models. This reduced the range of the timeline to study rather than looking into a broader range of data spanning more years, offering a more in-depth overview of the complexities and variability of the variables across time.

This study also offers future opportunities for research by going deeper into the topic while addressing the limitations above. A primary data collection method could be utilised to get first-hand data from national surveys, and interviews with government officials and other stakeholders. If there are no time constraints, adopting a large-scale primary data collection approach could provide a better view of the behaviours, attitudes and preferences of individuals on a national scale for a more tailored dataset that affords more robust reliability. To test the resilience of each country's financial inclusion policies and systems, there's also an opportunity to conduct longitudinal studies to gauge the overall long-term effects of demographic transition on financial market participation.

In conclusion, this study has provided meaningful empirical results related to the impact of demographic transition on financial market participation and how this impact varies in various regions of the world. This of course depends on the different economic and demographic situations experienced by these regions. Even though several factors also account for financial market participation, it is the responsibility of the governments and stakeholders of countries to ensure they create an atmosphere of economic development and financial inclusion on all levels of their citizenry or population. Financial markets serve as a major backbone of our financial systems and should be made accessible to more people by implementing the right strategies and policies.

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APPENDICES

Appendix 1. Model 1

Model 1: OLS, using observations 1-868 (n = 21)
Dependent variable: AOFI/MMSP
Heteroskedasticity-robust standard errors, variant HC1

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	102.743	45.0413	2.281	0.0387	**
Unemployment rate	0.779270	0.456438	1.707	0.1098	
Inflation rate	−0.444388	0.344870	−1.289	0.2184	
GDP per capita	11.8732	4.79344	2.477	0.0266	**
HCI	12.7489	31.7830	0.4011	0.6944	
Literacy rate	−1.19222	0.259094	−4.601	0.0004	***
Share of population below 15 years	−2.17476	0.433013	−5.022	0.0002	***

Mean dependent var	52.21952		S.D. dependent var	20.32231
Sum squared resid	1788.435		S.E. of regression	11.30245
R-squared	0.783481		Adjusted R-squared	0.690686
F(6, 14)	30.78783		P-value(F)	2.73e-07
Log-likelihood	−76.46574		Akaike criterion	166.9315
Schwarz criterion	174.2431		Hannan-Quinn	168.5183

Source: Author

Appendix 2. Model 2

Model 2: OLS, using observations 1-868 (n = 106)
Dependent variable: AOFI/MMSP
Heteroskedasticity-robust standard errors, variant HC1

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	−61.7212	22.1600	−2.785	0.0064	***
Unemployment rate	0.0511430	0.289269	0.1768	0.8600	
Inflation rate	0.139877	0.414203	0.3377	0.7363	
GDP per capita	10.6492	2.01383	5.288	<0.0001	***
HCI	55.7010	27.2732	2.042	0.0438	**
Share of population below 15 years	−0.132272	0.322293	−0.4104	0.6824	

Mean dependent var	66.20255		S.D. dependent var	26.30601
Sum squared resid	17581.63		S.E. of regression	13.25957
R-squared	0.758031		Adjusted R-squared	0.745933
F(5, 100)	87.30747		P-value(F)	6.75e-35
Log-likelihood	−421.2995		Akaike criterion	854.5990
Schwarz criterion	870.5797		Hannan-Quinn	861.0761

Source: Author

Appendix 3. Model 3

Model 3: OLS, using observations 1-868 (n = 91)
Dependent variable: AOFI/MMSP
Heteroskedasticity-robust standard errors, variant HC1

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	−74.9103	28.3909	−2.639	0.0099	***
Unemployment rate	0.212804	0.408526	0.5209	0.6038	
Inflation rate	0.305643	0.435601	0.7017	0.4849	
GDP per capita	34.6962	15.9794	2.171	0.0328	**
GNI per capita	−24.0848	15.7769	−1.527	0.1307	
HCI	67.2540	34.2516	1.964	0.0529	*
Labour Force	9.11149e-09	7.48468e-09	1.217	0.2269	
Share of population below 15 years	0.0242838	0.414733	0.05855	0.9534	

Mean dependent var	69.61220		S.D. dependent var	25.46670
Sum squared resid	14438.51		S.E. of regression	13.18931
R-squared	0.752637		Adjusted R-squared	0.731775
F(7, 83)	42.61536		P-value(F)	6.72e-25
Log-likelihood	−359.6626		Akaike criterion	735.3252
Schwarz criterion	755.4120		Hannan-Quinn	743.4290

Source: Author

Appendix 4. Overview of Comparison of FMP in Various Regions

OLS, using observations 1-868 (n = 405)
Dependent variable: AOFI/MMSP
Heteroskedasticity-robust standard errors, variant HC1

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	−37.4504	11.6158	−3.224	0.0014	***
Unemployment rate	−0.174950	0.124530	−1.405	0.1608	
Inflation rate	0.125137	0.123450	1.014	0.3114	
GDP per capita	14.0036	0.922932	15.17	<0.0001	***
Share of population below 15 years	−1.03644	0.151805	−6.827	<0.0001	***
country_africa	13.7909	3.80241	3.627	0.0003	***
country_other	−4.22859	1.91002	−2.214	0.0274	**

Mean dependent var	64.43689		S.D. dependent var	29.32642
Sum squared resid	89794.37		S.E. of regression	15.02045
R-squared	0.741566		Adjusted R-squared	0.737670
F(6, 398)	258.2246		P-value(F)	7.6e-134
Log-likelihood	−1668.452		Akaike criterion	3350.903
Schwarz criterion	3378.931		Hannan-Quinn	3361.997

Source: Author

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