

Fintech and Financial Inclusion in Saudi Arabia

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Abstract: The study explores the determinants of financial inclusion, barriers to financial inclusion, and the motivation for saving and credit through the formal financial sector. It further points out how Fintech could be used to enhance financial inclusion. The study uses the World Bank Global Findex Database 2017 survey. The survey is based on the feedback of more than 1000 individual participants. The probit estimation technique is employed to achieve the study objectives. Being male, educated, and rich are financially inclusive, especially high income and old age group. Financial inclusion has not been successful to eradicate inequality among various groups. Among individual characteristics, education significantly reduces the barriers to financial inclusion, the females are less motivated to save or borrow from financial institutions. Young individuals are likely to borrow for the purchase of a house or land but not for business. Elderly people are motivated to save for their old age. The distance and the cost of formal financial services along with the lack of documentation are the main barriers to financial inclusion. As per our knowledge, it is the first study that explores the various aspects of financial inclusion in the country, along with the review of the Fintech system. And suggesting how the Fintech system could enhance financial inclusion in the country. More comprehensive study including the Fintech variables and comparative studies with other regional economies considering the latest available data is suggested. The findings can help the policymakers, to formulate policies that can enhance financial inclusion through Fintech. The diversification and expansion of financial services could enhance financial inclusion, particularly for businesses at individual levels, and for SMEs. More importantly, it will contribute to achieving the financial sector objectives of Vision 2030.

Keywords: Financial inclusion, Fintech, Saudi Arabia, Financial sector, Vision 2030.

JEL Classification: G 23, G53, P 34.

INTRODUCTION

The financial sector development, economic growth, and development have been at the center of discussion among economists and policymakers around the globe. Even though they could not identify that some countries show remarkable economic growth and some do not, but, generally there is a census among economists that financial development contributes to economic growth and development (Le *et al.* 2019 and Khan and Senhadji, 2000). According to Khan and Senhadji (2000) financial sector, particularly financial intermediaries facilitates the mobilization of resources in the economy by mobilizing savings while reducing various economic costs. Existing empirical studies and theories point out that several economies could not achieve significant growth due to the underdevelopment of the financial sector. Among other factors, the failure is due to the lack of access to formal financial services for the majority of the population.

At the beginning of this century, research findings reported that financial exclusion is a significant factor that contributes

to inequality and poverty. Hence, financial inclusion was aimed to provide a wide range of formal financial services to marginalized sections of the population to meet their needs at a reasonable cost. But, what is financial inclusion? The existing literature provides various definitions with their relevant emphasis. For instance, Leyshon and Thrift (1995) consider the inclusion of the excluded population in formal financial services. Sinclair (2001) emphasizes access to primary financial services, Sarma (2008b) views it as a mechanism that aims to provide easy access, usage, and availability of financial services to every individual in society. Baber (2019) describes it as access to financial services at an affordable cost to every member of society. While, as per the World Bank Global Findex report by Demircuc-Kunt *et al.* (2018), access to formal financial services can help individuals to invest in their health, education, and business to attain development and prosperity. It also reported that 69 percent of the adults had an account with a formal financial institution in 2017, and there has been an increase from 62 percent since 2014 particularly due to mobile money providers. Accounts ownership is 94 percent in high-income economies compared to developing economies where it is 63 percent. Hence, World Bank suggested that financial inclusion i.e. accessibility and availability of financial services equally is an enabler in reducing poverty and boosting prosperity. It also identified financial inclusion as one of the key enablers

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for seven out of seventeen Sustainable Development Goals (SDGs)¹.

Several studies reported that financial inclusion resulted in significant development by adopting technology for financial services i.e. Fintech, and suggested that adopting Fintech in the local context could significantly contribute to economic progress (Senyo, and Osabutey, 2020; Demircuc-Kunt *et al.* 2018). Fintech covers digital innovations and technology-enabled business model innovations in the financial sector (Philippon, 2019, pp. 2). Other definitions include the intersection of finance and technology (Allen, Gu, and Jagtiani, 2021), the adoption of novel technologies in financial institutions (Gai, Qiu, and Sun, 2018), and providing financial services using mobile technology, (Demircuc-Kunt *et al.* 2018). The use of technology for various financial services includes blockchain technology in cryptocurrencies, peer-to-peer lending, crowdfunding, big data, artificial intelligence, machine learning, digital payments, Robo-advising, and so forth. According to Philippon, (2019), technological innovation and the adoption of its financial services are opening new venues of entrepreneurship and provides an equal access to financial services. It further argued that the use of technology in the financial sector has reduced the cost of financial intermediation. Allen, Gu, & Jagtiani, (2021) reported that Fintech has not only been very beneficial for consumers around the globe but it also has contributed to the efficiency of financial institutions. The study by Khan and Abdulrahman (2022) stated that Fintech through non-financial companies' startups contributes to financial intermediation. On the contrary, Le *et al.* (2019) concluded that financial inclusion adversely affects the efficiency of financial institutions, but enhances financial sustainability.

As there is a census among economists that financial inclusion and Fintech have the potential to contribute significantly to economic growth, which can further reduce the poverty and inequality. Therefore, the objectives of this study are, firstly, to explore the determinants of financial inclusion, saving motivations, and loan-taking motivations along with the factors that hinder financial inclusion in Saudi Arabia. Secondly, by reviewing the Fintech eco-system, the study will examine the current state of Fintech in the country. Finally, it articulates the suggestions that how financial inclusion can be enhanced by minimizing the barriers to inclusion, particularly, using the Fintech system in Saudi Arabia. It is expected that the findings of the study contribute to the body of knowledge by filling the literature gap by adding empirical evidence on the factors affecting financial inclusion in Saudi Arabia. It is further assumed that it will help the policymakers to analyze the progress of financial inclusion and assess the use of Fintech to achieve the country's economic objectives. Additionally, it will provide guidelines to the policymakers to achieve the objectives of the Financial Sector Development Plan (FSDP) under vision 2030, where the government is focusing on the development of a total of 21 sectors and emphasizes that the FSDP will contribute significantly to achieving the objectives in other related economic sectors.

The next section provides an overview of financial inclusion and Fintech in Saudi Arabia. The following section reviews the related literature. Section 4 presents the data, estimation, and results. Section 5 provides the discussion, section 6 reviews the Fintech and financial inclusion in the context of this study's findings, followed by the conclusion in the final section.

2. OVERVIEW OF FINANCIAL INCLUSION AND FINTECH IN SAUDI ARABIA.

According to SaudiFintech 2022 report, the use of advanced financial technology in Saudi Arabia is dated back to the 1990s when SAMA introduced MADA and SADAD as national payment clearance networks to reduce the payments fees. Since then several initiatives were taken to enhance the use of financial technology to achieve the objectives of financial development. Together with other developments, the FSDP emphasizes the role of Fintech to achieve the stability, efficiency, and inclusiveness of the financial sector in the Kingdom. In order to highlight the importance of financial inclusion Saudi Central Bank (SAMA) has started to embark on Arab financial inclusion day on 27th April 2018². The objective is to increase the accessibility of formal financial services for entrepreneurs and young individuals, it targets to achieve the contribution of Small and Medium Enterprises (SMEs) to 35 percent of GDP by providing support for them to easy and quick financing and to increase the number of adults with bank accounts to 90 percent. According to the FSDP program charter 2021³, 71 percent of adults and 58 percent of women have a bank account. While, the level of financial inclusion in the country was at 78 percent in 2017, among men and women. Moreover, it also reported that formal financing for SMEs was only 5%. Hence, the country still lagged behind high-income countries in terms of formal account ownership and SMEs financing through formal financial institutions. To minimize the financial inclusion gap and enhance the efficiency and stability of the financial sector and achieve the diversification of economic sectors and economic growth government began focusing on Fintech.

The participation of technological companies, government, and financial institutions is the prerequisite for the development of the Fintech ecosystem. In this regard, two regulatory authorities SAMA and Capital Market Authority (CMA) have initiated the SaudiFintech to facilitate the Fintech startup companies, a *regulatory sandbox* has been introduced in 2018 to provide a conducive environment for the Fintech companies in their early stage. According to SAMA⁴ in the year 2018 seven and 2019, fourteen companies obtained a license under the *regulatory sandbox*. Currently, according to SAMA⁵ as of December 2021, 26 Fintech companies and 14 banks have participated in the *sandbox* since its inception. Where payments dominate the Fintech system with around 35 percent, for banks half of the activities are focusing on

² <https://www.sama.gov.sa/en-US/News/Pages/news26042018.aspx>

³ <https://www.vision2030.gov.sa/v2030/vrps/fsdp/>

⁴ https://www.sama.gov.sa/en-US/Documents/Open_Banking_Policy-EN.pdf

⁵ https://www.sama.gov.sa/en-US/EconomicReports/Financial%20Stability%20Report/Financial_Stability_Report_2022_EN.pdf

¹ <https://www.worldbank.org/en/topic/financialinclusion/overview#1>

retail digital onboarding process accounts. According to World Bank till 2020⁶ 98 percent of the population in Saudi Arabia were using or had access to the internet. Therefore, it is assumed that in terms of the demand side of Fintech, there is a huge potential and sufficient infrastructure that can help the country to achieve its objectives. Likewise, on the supply side the technological companies, financial institutions, and government are working collectively to promote Fintech in the country. Despite the pros and cons, the Fintech industry has to go long way by developing the relevant infrastructure, educating the people, encouraging the investors to invest in the relevant field, and training and support the growth of human talent to meet the industry demands in the future.

3. RELEVANT LITERATURE

Financial development is considered an important factor for economic growth and is interdependent with it. Existing studies highlight four main areas that contribute to financial development that can enhance economic growth (Babajide *et al.*, 2015). These include reliable means of payments, financial intermediation for the allocation of resources (Odeniran and Udejaja, 2010), managing risk and limiting liquidity risk by the financial system (Bencivenga and Smith, 1991), and financial system providing suitable information for investments by reducing the information asymmetry and transactions cost (Levine, 2005).

Financial inclusion is a prerequisite of financial development and is an important driver of economic growth. It is a process that marks an improvement in quantity, quality, and efficiency of financial intermediary services (Babajide *et al.*, 2015), or in simple words, it refers to the “access to formal financial services” (See. Demircuc-Kunt *et al.*, 2018). As per the agenda of the World Bank, it is not only about access to formal financial services, but also on time at an affordable cost, particularly for the vulnerable section of the population. It heavily focuses on services, such as payments, access to credit, savings, insurance, etc. for adults and women in particular. As per Mbiti and Weil, (2011) offering financial services to people that could encourage them to save is the real essence of financial inclusion. The saving significantly affects the supply of credit. Several studies highlighted the benefits of credit services and the role of credit suppliers in the economy (Banerjee *et al.*, 2015, Karlan and Zinman, 2009). Contrary to this, Roodman (2012) warns about the disadvantages of credit schemes, Bar-Gill and Warren, (2008) points out the limitations of consumer credit. Additionally, Hariharan and Marktanner (2012) reported multiple socioeconomic factors that hinder financial inclusion including inequality, religion, culture, geography history, economic structure, and policy.

In the existing literature, multiple studies have explored the role of financial inclusion in financial development, the role of Fintech on financial inclusion, and the determinants of financial inclusion. According to Turegano and Herrero (2018) after controlling for fiscal policy and economic development financial inclusion reduces income inequality across countries, while the size of the financial sector does

not contribute to financial inclusion. The study by Kabakova and Plaksenkov (2018) on 43 developing economies reported that high social, socio-demographic, technology, political and economic factors contributed to financial inclusion. An empirical study by Khan *et al.* (2021) reported that financial inclusion is an important factor to reduce poverty and achieve financial stability in 54 African countries. The review of financial inclusion around the globe by Ozili (2021) stated that financial inclusion is inclined by financial literacy, economic level, financial sector stability, poverty level, regulatory framework, and financial innovation across countries. Moreover, financial inclusion has a significant impact on these factors. Allen *et al.* (2016) found that lower account costs, strong legal rights, a stable political environment, and easy access to financial intermediaries are associated to have a formal account.

Several studies support the use of Fintech or financial innovation to achieve financial inclusion, for instance, Chinoda & Kwenda (2019), Ouma *et al.* (2017) reported that mobile phone penetration has contributed positively to financial inclusion in 49 countries in Africa, Al-Mudimigh, & Anshari, (2020) concluded that Fintech supported the level of financial inclusion in South East Asia, mobile banking contributed to financial inclusion in Africa (Zins & Weill, 2016), financial innovation is used to achieve inclusive growth and financial inclusion Beck *et al.* (2015). According to Arner *et al.* (2015), the relationship between financial services and technology is not novel, the financial sector is the largest user and buyer of information technology. They further argued that China dominates Fintech in 2016 due to digitally informed growing young mobile users increasing the demand for Fintech. The study by Senyo & Osabutey (2020) reported that Fintech innovations are increasing financial inclusion using mobile accounts for the unbanked population and the behavioral response of the users is also satisfied and feel safer.

According to Demircuc-Kunt *et al.*, (2018), the existing research supports the potential development outcomes of financial inclusion, particularly using the technology for financial services such as mobile money, online and card payments, and other related Fintech. The same study based on Global Findex Database (GFD) 2017, reported that account ownership among adults has increased from 51 percent to 62 percent to 69 percent from 2011 to 2014 to 2017. Where account ownership is up to 94 percent in high-income economies and 63 percent in developing economies. However, account ownership has increased during the period but several factors hinder account ownership in individual economies. For instance, there is an inequality of account ownership based on gender, where 72 percent of men own an account compared to 65 percent of women as per GFD, 2017. Contrary to this the gap is 9 percent in the developing economies. While being rich or poor, educated or uneducated also has an impact on account ownership inequality. The majority of the unbanked population is comprised of women, the poorest households, and low levels of education. The report also pointed out that in high-income economies account holders use digital finance to access their accounts or make payments (around 97 percent of account owners) compared to 70 percent of account owners in developing countries. In terms of formal credit and savings, having access to formal

⁶ <https://data.worldbank.org/indicator/IT.NET.USER.ZS?locations=SA>

credit, saving money, and managing financial risk also contribute to financial inclusion.

Based on GFD (2017) Demirguc-Kunt *et al.* (2018) reported the barriers to financial inclusion. The survey responded that one of the biggest contributors to the financial exclusion for individuals without formal accounts is not having sufficient money, followed by, do not need an account, and owning an account being expensive respectively. Other reasons include other family members having an account, financial institutions being far away, do not trust financial institutions, and do not own an account due to religious beliefs.

Based on the objectives, the study tested the following hypothesis.

H01: The use of formal financial services is higher for individuals in a higher-income group.

H02: The level of ownership for accounts (formal financial) is higher for the male group.

H03: The level of savings and loans is higher for higher income and age groups.

4. DATA AND RESEARCH MODEL

To explore the factors affecting financial inclusion in Saudi Arabia, the study uses the World Bank GFD 2017. The GFD is based on the survey by Gallup World Poll conducted in 2011, 2014, and 2017. However, the study uses the latest version of the survey i.e. 2017 for an updated overview of financial inclusion in Saudi Arabia. The survey is based on the feedback of more than 1000 individual participants. The respondents of the survey were aged 15 and above. The survey provides micro-level data and includes information about, gender, age, income level, and education level. Following the earlier studies (Zins and Weill, 2016), the study uses three dependent variables to measure financial inclusion (i) formal account refers to those individuals who have an account at any formal financial institution or mobile money or alternative financial service provider. (ii) formal savings, where individuals use the financial institution for savings during the last 12 months (iii) formal credit, where individuals borrowed money from any formal financial institution during the last 12 months. The individual characteristics have been used as independent variables i.e. gender (the respondent is male or female), income level is divided into 5 groups i.e. poorest 20 percent, poorest 2nd 20 percent, middle income 20 percent, rich 20 percent, and richest 20 percent, and the education, it is divided into three levels the respondent has complete primary, secondary or tertiary education.

Similar individual characteristics are used as independent variables to find out the determinants of savings, by using savings motivation factors as dependent variables, such as saving for business or farm, for education and old age. And using the borrowings' motivational factors as dependent variables, such as borrowing for education, medical, farm, or business, and to buy a house or land purposes. Finally, similar individual factors are used to explore the barriers to financial inclusion. The completed detail about the survey,

responses, and variables explanation is available in detail on World Bank⁷ and Demirguc-Kunt *et al.*, (2018).

4.1. Variables

The study uses the micro-level individual characteristics and created several dummy variables and uses these variables as independent variables to explore various factors related to financial inclusion. The description of the variables is given in table 1.

Table 1. Description of Explanatory Variables.

Variable Name	Definition
<i>Gender (female)</i>	If the individual is a woman dummy variable is equal to one, zero otherwise
<i>Age</i>	Age of individuals in a number of years (15 years or above)
<i>Income-poorest 20%</i>	If the income is in the lowest quantile dummy variable is equal to one, or zero otherwise
<i>Income-poorest 2nd 20%</i>	If the income is in the 2 nd lowest quantile dummy variable is equal to one, zero otherwise
<i>Income-middle 20%</i>	If the income is in the middle quantile dummy variable is equal to one, or zero otherwise
<i>Income rich 20%</i>	If the income is in the 2 nd rich quantile dummy variable is equal to one, zero otherwise
<i>Income richest 20%</i>	If the income is in the richest quantile dummy variable is equal to one, zero otherwise
<i>Education (Primary)</i>	If the primary level or less education is completed dummy variable is equal to one, zero otherwise
<i>Education (Secondary)</i>	If the secondary level education is completed dummy variable is equal to one, zero otherwise
<i>Education (Tertiary)</i>	If the tertiary level education is completed dummy variable is equal to one, zero otherwise

Source: Authors' adoption from GFD 2017.

4.2. Research Model

Most of the variables based on GFD 2017 are converted into dummy variables, and to examine the determinants of financial inclusion, savings, borrowings, and barriers to financial inclusion. The study adopted the model from the existing literature (Zins and Weill, 2016) and performed probit estimation. The estimation model is below.

$$X_i = \alpha + \beta * Gender_i + \sigma * Age_i + \varphi * Income_i + \rho * Education_i + \varepsilon_i$$

The X represents the variables of financial inclusion and *i* denotes one individual. The individual characteristics i.e. gender, age, income level, and education level are the explanatory variables. All these variables are converted into dummy variables and the description of each variable is given in table 1. One new variable is created by taking the

⁷ <https://microdata.worldbank.org/index.php/collections/global-findex>

square of Age i.e. (Age)² to control for a possible nonlinear relationship between age and financial inclusion (Zins and Weill, 2016).

5. RESULTS AND DISCUSSION

5.1. Descriptive Statistics

Firstly, the descriptive statistics of dependent variables i.e. all the indicators of the financial inclusion used in the estimation are given in Table 2, which presents the mean and the standard deviation of the data on Saudi Arabia. The average of the three formal financial services indicators in Saudi Arabia is relatively high compared to other countries, for instance, Demirguc-Kunt *et al.*, (2018) reported global account ownership at 69 percent while it is 74.5 percent, the savings at the formal institution in the last 12 months is average at 49.8 percent, which is less than high-income economies and higher than the developing economies, which is around 60 percent and 40 percent respectively. The financial inclusiveness in Saudi Arabia is quite progressive as compared to several developing countries for instance compared to the African region as reported by Zins and Weill (2016). The mean of the credit from formal institutions is 58.5 percent which is close to the average of formal borrowing in high-income economies reported by Demirguc-Kunt *et al.* (2018). Individuals' motivation for savings is 19.7 percent for business and 12.1 percent for old age. Motivation for savings in Saudi Arabia is quite contradictory to high-income economies as per Demirguc-Kunt *et al.* (2018) half of the adult population do the savings for old age and around 14 percent for or to start a business. The results endorse the hypothesis of the study that the rich male individuals at an older age with higher income are more inclusive in the formal financial sector.

Table 2. Descriptive Statistics of Dependent Variables.

Variable	Obs	Mean	Std. Dev.
Financial inclusion indicators			
Formal account	1009	0.745	0.436
Formal savings	1009	0.498	0.5
Formal credit	1009	0.583	0.493
Motivation for savings			
For business	1009	0.197	0.398
For old age	1009	0.121	0.326
Credit/borrowing motivation			
For home	1009	0.172	0.378
For medical	1009	0.111	0.314
For business	1009	0.074	0.262
Financial inclusion barriers			
Too far away	328	0.125	0.331
Too expensive	328	0.253	0.435

Lack of documents	328	0.201	0.402
Lack of trust	328	0.082	0.275
Religion	328	0.061	0.24
Not enough money	328	0.558	0.497
Another family member has an account	328	0.418	0.494
Do not need financial services	328	0.409	0.492

Source: Authors' calculations based on World Bank GFD, 2017.

The mean of formal borrowing for homes is high compared to borrowing for medical purposes and businesses with an average of 17.2, 11.1, and 7.4 percent respectively. As per the GFD survey, the main reason for adults to borrow from the formal institution was to purchase a home or land around 27 percent in high-income and 10 percent in developing economies. The share in developing economies is quite low where individuals borrow from family or friends compared to formal financial institutions. For barriers to financial inclusion, the highest factor for the barrier to financial inclusion as per mean is "not having enough money" around 55 percent whereas 41 percent responded that other family members have an account followed by 40 percent of respondents who think they do not need financial services. Around 25 percent think that financial services are expensive, whereas 20 percent do not have sufficient documents. Quite remarkably around 6 percent of the respondents reported religious belief as a barrier to financial inclusion, which is close to the global average of 6 percent but is relatively low compared to other Muslim countries like Pakistan and Turkey where the mean is 13 and 19 percent respectively (Demirguc-Kunt *et al.* 2018).

The descriptive statistics of individual characteristics used as explanatory variables are presented in Table 3. The summary statistics show that 36 percent of the respondents were female, more than 50 percent of respondents fall into the middle or lower-income level and around 45 percent of respondents were rich, 55 percent of respondents have completed secondary education followed by 37 percent tertiary education and 7.6 percent had primary or less than primary education.

Table 3. Descriptive Statistics of Individual Characteristics.

Variable	Obs	Mean	Std. Dev.
Gender	1009	0.36	0.48
Lnage	1009	3.436	0.309
Poorest 20% (Income)	1009	0.175	0.381
Poorest 2 nd 20% (Income)	1009	0.182	0.386
Middle 20% (Income)	1009	0.182	0.386
Richest 2 nd 20% (Income)	1009	0.216	0.412
Richest top 20% (Income)	1009	0.244	0.43
Secondary education	1009	0.552	0.498
Primary education	1009	0.076	0.266

Tertiary Education	1009	0.372	0.483
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Source: Authors'' compilation based on GFD, 2017.

5.2. Determinants of Financial Inclusion

The main indicators of financial inclusion and their marginal effects as per probit estimation are given in table 4. Formal account ownership, formal savings, and formal borrowing from financial institutions are used as dependent variables. Whereas, individual characteristics are used as explanatory variables. The results show that all the individual characteristics have a significant association with all the indicators of financial inclusion. Having a formal account, savings, or formal credit significantly decreases for females. Age has a positive and significant association with formal accounts and credit while a negative and significant association with savings predicts that young individuals are less likely to save. While the increase in age has a negative and significant association with formal accounts and credit, depicting that financially included Individuals are likely to exclude from the formal financial system with the increase in age. While their savings have a positive and significant association among elder individuals.

Table 4. Main factors of financial inclusion in KSA

	Account	Saving	Credit
Gender	-0.604*** (0.095)	-0.183** (0.086)	-0.416*** (0.085)
Age (ln)	14.584*** (2.541)	-5.489** (2.387)	5.627** (2.323)
Age ² (lnage) ²	-1.987*** (0.366)	0.719** (0.343)	-0.856** (0.334)
Poorest 20% (Income)	-0.733*** (0.150)	-0.380*** (0.133)	0.148 (0.132)
Poorest 2 nd -20% (Income)	-0.569*** (0.149)	-0.461*** (0.128)	0.057 (0.127)
Middle 20% (Income)	-0.453*** (0.150)	-0.267** (0.127)	0.070 (0.128)
Rich 20% (Income)	-0.170 (0.150)	-0.202* (0.120)	0.028 (0.120)
Secondary education	0.354** (0.170)	0.602*** (0.178)	-0.102 (0.165)
Tertiary education	0.559*** (0.181)	0.898*** (0.185)	0.086 (0.173)
Constant	-25.527*** (4.362)	9.938** (4.110)	-8.812** (3.998)
No. of Observations	1,009	1,009	1,009

PseudoR ²	0.1572	0.055	0.029
Log-likelihood	-482.552	-660.715	-666.317
Predicted probability (at mean values)	0.74	0.49	0.58

Probit estimation results on determinants of financial inclusion in KSA. It includes dependent variables, formal accounts, savings, and credit at a financial institution. Explanatory variables include individual characteristics i.e. gender, age, income, and education level. SE is given in parenthesis. * is significance level at p<0.1; ** p<0.05; *** p<0.01.

Findings further suggest that possibility of the inclusion in the formal financial system increase with the increase in income, poorest to middle-income level population has a negative and significant association with the possibility of account, savings, and credit from a formal financial institution. Being rich increases the probability to have access to formal credit compared to low or middle-income individuals. Moreover, being educated increases the probability to include in the formal financial sectors. In contrast, being educated shows a negative but insignificant association with borrowing from any financial institution.

The factors affecting financial inclusion in Saudi Arabia show the stylized facts as reported by earlier studies. Such as, the probability to have access to formal financial services is high for rich and educated individuals as reported by Allen *et al.* (2016) for global economies, Zins and Weill (2016) in Africa, and Fungacove and Weill (2015) reported in case of China. Interestingly gender-based inequality is similar to those of developing economies. The marginal effects suggest that 60 percent chances being a woman will not have access to formal financial services as per observed inclusion indicators. These results are in line with the findings of Siddiqui *et al.* (2019) study on India, Zins and Weill (2016) study on Africa, and Fungacove and Weill (2015) study on China. However, on a global scale, Allen *et al.* (2016) reported no inequality based on gender. Based on the estimation it can be concluded that income and education are the two main significant individual characteristics that can enhance financial inclusion in Saudi Arabia. But the lower income adversely affects access to formal financial services. In summary, the findings endorse the hypothesis of the study that rich male individuals at an older age with higher income are more inclusive in the formal financial sector.

5.3. Factors Hampering the Financial Inclusion

To analyze how individual characteristics, influence the decision to have a formal account or not the study explored the barriers to financial inclusion. Allen *et al.* (2016) categorized these barriers as voluntary and involuntary reasons not to own an account. The reasons like "family member as an account" "lack of money" and "religious reasons" are considered voluntary. While other factors such as lack of trust, lack of documentation, distance, and high cost are the reason for involuntary exclusion, and these factors are driven by market failure. The results of factors as a barrier to financial inclusion are presented in Table 5. The results suggest that women's main reason for not having an account is, having an account by a family member, in this case, other barriers are less important for women. This suggests that gender-based exclu-

Table 5. Factors as Barriers to Financial Inclusion.

	Too far Away	Too Expensive	Lack of Documents	Lack of Trust	Religion	Not Enough Money	Another Family Member has an Account
Gender	-0.43**	-0.439***	-0.205	-0.745***	-0.177	0.048	0.712***
	(-0.19)	(-0.161)	(-0.164)	(-0.231)	(-0.232)	(-0.143)	(-0.15)
Age (ln)	-1.032	5.151	-1.039	6.994	-3.93	1.136	-2.996
	(-4.815)	(-4.132)	(-4.025)	(-6.361)	(-5.273)	(-3.546)	(-3.776)
Age ² (lnage) ²	0.064	-0.755	0.105	-1.114	0.59	-0.151	0.279
	(-0.712)	(-0.606)	(-0.588)	(-0.956)	(-0.769)	(-0.517)	(-0.554)
Poorest 20% (Income)	0.211	0.263	0.153	-0.148	0.147	0.450**	-0.169
	(-0.304)	(-0.283)	(-0.249)	(-0.333)	(-0.398)	(-0.228)	(-0.235)
Poorest 2 nd -20% (Income)	0.166	0.704**	-0.131	0.062	0.541	0.277	0.012
	(-0.324)	(-0.292)	(-0.27)	(-0.341)	(-0.387)	(-0.24)	(-0.245)
Middle 20% (Income)	0.185	0.297	-0.405	-0.397	0.35	0.018	-0.265
	(-0.324)	(-0.299)	(-0.283)	(-0.389)	(-0.399)	(-0.239)	(-0.25)
Rich 20% (Income)	-0.137	0.412	-0.493*	-0.273	-0.393	0.125	-0.25
	(-0.347)	(-0.298)	(-0.29)	(-0.355)	(-0.513)	(-0.239)	(-0.252)
Secondary education	-0.508*	-0.667***	-0.249	0.083	0.255	-0.107	-0.341
	(-0.265)	(-0.238)	(-0.246)	(-0.357)	(-0.371)	(-0.235)	(-0.245)
Tertiary education	-0.637*	-1.368***	-0.299	-0.109	0.015	-0.367	-0.011
	(-0.333)	(-0.304)	(-0.291)	(-0.424)	(-0.445)	(-0.264)	(-0.274)
Constant	2.106	-8.805	1.907	-11.818	4.629	-2.018	6.613
	(-8.048)	(-6.955)	(-6.798)	(-10.492)	(-8.897)	(-6)	(-6.36)
No. of Observations	328	328	328	328	328	328	328
Pseudo R ²	0.07	0.10	0.04	0.09	0.05	0.02	0.11
Log-likelihood	-114.64	-165.344	-156.783	-84.475	-71.050	-219.685	-198.083
Predicted probability (at mean values)	0.12	0.25	0.20	0.08	0.06	0.55	0.41

Probit estimation results on determinants of barriers to financial inclusion in KSA. It includes explanatory variables and individual characteristics i.e. gender, age, income, and education level. SE is given in parenthesis. * is significance level at $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

sion is primarily based on cultural reasons in Saudi Arabia, while market failures are less likely the reasons for exclusion from formal financial services based on gender. These findings are in line with the results of Zins and Weill (2016), and Aterido *et al.* (2013). Regarding the age factor, young individuals are adversely affected by lack of trust, too expensive, and lack of money. While, for elders too far, lack of documents and religious beliefs are common barriers to inclusion. In the case of income groups, for the poorest not having sufficient money is a significant barrier compared to other barriers that show no significant adverse effects. Interestingly education plays a significant role to minimize the barriers to financial inclusion. For educated individuals, religious belief is only one factor that has a negative association but statisti-

cally, it is insignificant. In summary, results predict that most of the reasons for financial exclusion are voluntary instead of market failure in Saudi Arabia and income and education are the primary drivers of financial inclusion. These results are congruent with the findings of Zins and Weill (2016) study on Africa, and Fungacova and Weill study on China.

5.4. Understanding Saving and Credit Behavior

To examine the wider view on determinants of financial inclusion in Saudi Arabia, this section provides evidence on motivation for savings and credit particularly motivation for the use of formal financial services. To understand saving behavior two motivations for savings i.e. savings for business and savings for old age are considered. The purpose is

to analyze these motivations to individual characteristics. The result of saving behavior on given in Table 6.

Table 6. Determinants of Savings Motivation.

	Savings for Business	Savings For Old Age
Female	-0.416***	-0.105
	(0.104)	(0.114)
Age (ln)	-2.895	-6.633**
	(2.675)	(2.891)
Age ² (lnage) ²	0.379	1.044**
	(0.384)	(0.411)
Poorest 20% (Income)	-0.374**	0.041
	(0.157)	(0.171)
Poorest 2 nd -20% (Income)	-0.459***	-0.183
	(0.152)	(0.172)
Middle 20% (Income)	-0.159	-0.035
	(0.142)	(0.165)
Rich 20% (Income)	-0.105	0.045
	(0.130)	(0.151)
Secondary education	0.428*	0.258
	(0.247)	(0.228)
Tertiary education	0.794***	0.533**
	(0.253)	(0.234)
_cons	4.347	8.868*
	(4.604)	(5.026)
No. of Observations	1,009	1,009
PseudoR ²	0.05	0.060
Log-likelihood	-353.339	-470.563
Predicted probability (at mean values)	0.19	0.12

Probit estimation results on motivation for saving to individual characteristics in KSA. SE is given in parenthesis. * is significance level at * p<0.1; ** p<0.05; *** p<0.01.

The results suggest that both savings motivations are related in the same way to all individual characteristics, which means that individuals saving behavior is the same for gender, age, income, and education level. Being female the probability of saving decreases by 41.6 percent which is significantly high compared to the African region as reported by Zins and Weill (2016). In terms of age group young individuals are less likely to save for business and old age, on the contrary for elder people saving for old is a primary motivation for savings. The level of income is not significantly encouraging savings except for rich people who are motivated to save for old age. Education level significantly motivates

individuals to save for both business and old age. Hence, being male and in the old age group are motivated to save more compared to the female and young age group.

The factors that influence the borrowing behavior of the individuals are examined by three motivational factors i.e. formal credit for home, medical, and business. The estimation results on the determinants of credit behavior are presented in Table 7.

Table 7. Determinants of Credit Motivation.

	For Home	For Medical	For Business
Female	-0.788***	-0.063	-0.456***
	(0.125)	(0.114)	(0.142)
Age (ln)	15.706***	9.440***	5.637
	(3.708)	(3.595)	(4.048)
Age ² (lnage) ²	-2.136***	-1.376***	-0.902
	(0.524)	(0.520)	(0.592)
Poorest 20% (Income)	-0.433***	0.225	-0.062
	(0.168)	(0.173)	(0.189)
Poorest 2 nd -20% (Income)	-0.479***	0.203	-0.284
	(0.164)	(0.168)	(0.196)
Middle 20% (Income)	-0.188	0.207	-0.318
	(0.153)	(0.168)	(0.197)
Rich 20% (Income)	-0.117	-0.039	-0.141
	(0.141)	(0.170)	(0.172)
Secondary education	0.183	-0.139	0.032
	(0.218)	(0.202)	(0.270)
Tertiary education	0.100	-0.278	0.061
	(0.227)	(0.215)	(0.283)
_cons	-29.276***	-	-9.874
	(6.510)	(6.162)	(6.882)
N	1,009	1,009	1,009
PseudoR ²	0.11	0.022	0.04
Log-likelihood	--410.628	-343.913	-255.12
Predicted probability (at mean values)	0.17	0.11	0.07

Probit estimation results on motivation for borrowing to individual characteristics in KSA. SE is given in parenthesis. * is significance level at * p<0.1; ** p<0.05; *** p<0.01.

The three loan-taking motivations show different associations with each individual's characteristics. Women in Saudi Arabia are less likely to borrow for home and business and the relationship is significant. In terms of age young people are more inclined towards borrowing to purchase a home or

land and for medical purposes. Income level adversely affects the borrowing motivation for middle or low-income level individuals even though they are less likely to borrow for business. Education level could be considered an encouraging factor for formal borrowing, but the relationship is insignificant. Hence, for credit from formal financial institutions male and the rich are motivated to borrow for purchasing a house, and land for medical purposes, compared to the female group. The study by Khan, Bashir and Islam (2021) reported that Saudi banks have more deposits than loans and have potential to contribute to the formal financing, hence the inclusion of the marginalized population to the formal sectors can be achieved.

6. FINTECH AND FINANCIAL INCLUSION

This section provides an overview of the relationship between Fintech and financial inclusion, specifically suggesting the use of Fintech to enhance financial inclusion by removing the barriers to inclusion in Saudi Arabia. From the results, it is found that females, elder age, and being poor are adversely affecting the inclusion process. As the objective of financial inclusion is to bring the marginalized section of the population to the formal financial sector to promote equality, there is a need to encourage access to financial services for female elder people and the poorest section of the population. In terms of analyzed indicators of inclusion around 50 percent of the population is using formal institutions for savings and borrowing. The main barriers to these formal services are distance and cost. In this case, Fintech startups or the use of technology can address these issues by providing cheap financial services with quick and easy access. In terms of borrowing for business, only 7.4 percent of individuals use the formal sector to borrow for business.

According to Philippon, (2019), financial innovation reduces the cost of financial intermediation, hence it is assumed that the use of various financial technologies can lend a hand to minimize the cost of intermediation in Saudi Arabia as well. Siddiqui and Siddiqui (2020) stated that the use of telecom technology increases the awareness, usability, and availability of banking services. As per the SaudiFintech survey 2021⁸ one of the primary areas where Fintech is flourishing is in payments, however, the use of cash is still dominant among elders and in remote areas. But, individuals are looking for more Fintech services in the area of payments, savings, and investment. It also reported that the adoption of Fintech is 80 percent for the age group between 16-39 years. It also highlighted the disparity among age groups and remote regions in the use of Fintech. As of 2021, there are 82 active Fintechs in the country focusing on e-payments, equity crowdfunding, Robo-advising, peer to peer lending. And also to promote the Fintech ecosystem SAMA has initiated a *regulatory sandbox*. However, there is still a need to focus on compliance and product development. The problem with the adoption of Fintech and barriers to financial inclusion are almost similar, especially the elderly population, distance from financial institutions, and cost of service. As discussed earlier, cost-efficient Fintech system could enhance the effi-

ciency of the financial system by introducing Fintech startups and the use of technology in conventional financial institutions. Therefore, focusing on product development targeting the marginalized population age-wise and area-wise can enhance the progress of Fintech, which can ultimately contribute to financial inclusion. Secondly, technology-based crowd funding platforms can also increase the financing opportunities for SMEs which is also a significant concern, especially under Vision 2030 where the government is planning to diversify the economic sectors.

7. CONCLUSION

The financial inclusion in Saudi Arabia is relatively low compared to other high-income economies. It could be due to cultural reasons where the female is more dependent on the male. Hence, having no or low income the female group ultimately excludes from major financial services. However, recently this pattern is changing and there is more and more economic independence in the female group. This can result in their inclusion in the formal financial sector. It can also facilitate the female to enter the employment sector.

Financial inclusion in the case of Saudi Arabia can contribute to the diversification of economic sectors by providing access to formal financing for individuals and SMEs. The study explores the determinants of financial inclusion, barriers to financial inclusion, and the motivation for saving and credit through the formal financial sector. The results indicate that being male, educated, and rich are financially inclusive, especially for high-income and old age groups.

As the objective of financial inclusion is to include the marginalized section in the formal sector, policies should facilitate certain population groups, such as women, and young individuals, with a lower level of education and income. The current data infers that financial inclusion has not been successful to eradicate inequality among different groups. It also reveals that education is a primary factor that can significantly reduce the barriers to financial inclusion. In terms of motivation for saving and borrowings, females are less likely to save or borrow for any observed motivational factors. Young individuals are likely to borrow for the purchase of a house or land significantly and business but less significantly. Elderly people are likely to save for their old age. The main barriers to financial inclusion that are identified are the distance and the cost of formal financial services along with the lack of documentation. Finally, it is suggested that the efficient use of the Fintech system can enhance financial inclusion particularly, by providing less documented, and nearby financial services at an affordable cost to the marginalized population.

In summary, it is assumed that the findings of the study can help policymakers to formulate policies that can enhance access to the formal financial sector, particularly for businesses at individual levels and for SMEs. The formal financing for SMEs is also significantly low in Saudi Arabia. Even though the country is actively promoting the Fintech ecosystem it is suggested to encourage the Fintech startups or traditional financial institutions to adopt innovative technologies to minimize the cost of services and provide the access to the elderly individuals, the population in remote areas,

⁸https://fintechsaudi.com/wp-content/uploads/2021/08/Fintech_Adoption_Survey_English.pdf

along with the encouragement of female to participate in the formal financial sector.

Finally, the study focuses only on the economy of Saudi Arabia, but a comparative study focusing on the other similar economies of the GCC is recommended. In addition, it is suggested to use Fintech as a variable to evaluate the progress of Fintech and its impact on financial inclusion in the region.

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