

RESEARCH ARTICLE

# A Study on the Influence of Digital Finance on Bank Account Ownership of Filipinos

Ian Carlo Antonio<sup>1</sup> and Maire Carroline Magante<sup>2\*</sup>

<sup>1</sup>Central Bank of the Philippines, Manila, Philippines

<sup>2</sup>Ateneo De Manila University, Quezon City, Philippines

\*mmagante@ateneo.edu

**Abstract:** Financial inclusion remains a recurring problem that various governments need to address. Despite digitalization, financial institutions struggle to make their products and services available to the public. The Philippines has among the weakest financial inclusion coverages, as shown by the minimal account penetration of the population. This study used the 2019 Financial Inclusion Survey (FIS), specifically mobile phone usage in financial transactions and other socioeconomic characteristics as determinants of financial inclusion measured by bank account ownership. The findings show that mobile phones, financial literacy, and urbanity remain as significant players in accessing financial products and services, but in varying degrees of importance.

**Keywords:** financial inclusion, bank account ownership, urbanity, access, financial technology

Financial inclusion is the condition where there exists effective access to various finance-related products and services that are accessible for all sectors, particularly the vulnerable segment of the population (Bangko Sentral ng Pilipinas, 2021). It serves as the foundation for a country's national development that is both sustainable and unbiased by providing life-altering financial services to the public. This is a pressing issue because studies such as those by Hannig and Jansen (2010) stressed the importance of financial systems in promoting growth, specifically in the low-income population strata. Regardless of its potential benefits, financial inclusion has been a long-standing issue that numerous countries in the world have yet to fully address. The transformative role of financial inclusion in society has been acknowledged by numerous organizations such as the United Nations

and World Bank (Demirgüç-Kunt et al., 2017). With this universal importance, the development of financial inclusion has been among the top priorities in various governmental policies across the globe.

According to Llanto et al. (2018), the Philippines has long been spearheading the road to a financially included society, as seen by the various initiatives that involved the unserved, underserved, and even small and medium enterprises (SMEs). However, the use of these financial instruments remains to be a hindrance to achieving a financially inclusive society for Filipinos. Financial inclusion data in the Philippines is carried out by the Bangko Sentral ng Pilipinas (BSP) (2019) Financial Inclusion Survey (FIS), a nationally encompassing survey devoted to gathering financial inclusion information from users and non-users of financial products and services. Based on the latest

FIS conducted in 2019, account ownership of Filipinos with financial institutions remains low at 28.6% among the adult population. Bank account ownership, in particular, is only at 12.2%. The BSP, the institution that promotes comprehensive and suitable access to quality financial services, aims to achieve at least 70% of adult Filipinos owning a formal account that they regularly use for day-to-day transactions by 2023. The stance of the BSP is to facilitate ease of access to financial transactions through financial technology with the aim of making financial transactions easier and faster while making financial products and services accessible, altogether aiming for a financially inclusive society.

A study conducted by Llanto et al. (2018) examined the involvement of technology concerning financial inclusion in the Philippines. The study also analyzed whether e-finance has allowed the most underserved members of society to use these financial products and services inexpensively and accessibly. Based on the conclusion and findings of the study, digital finance could become a probable avenue towards a more complete financial environment. With suitable and reasonably priced technology, the financially excluded sectors of society could ease their way into mainstream banking and finance. However great the potential benefits are, such as the increase in the number of accounts and worth in e-money dealings, there is still a low digital implementation rate (Llanto et al., 2018). Barriers such as financial literacy, documentation, and internet infrastructure are still present, and these prevent Filipinos from accessing digital finance.

Although the findings of Llanto et al. (2018) on the current status of financial inclusion in the Philippines are informative, there has been limited literature focusing on the role of digitalization. Because bank account ownership is one of the key elements in financial inclusion, this research examines the influence of digitalization, measured through the use of mobile phones, in financial transactions towards bank account ownership of Filipinos.

The purpose of this research is to deliver empirical proof of the range of financial access in the Philippines. This is done by centering on the standpoint of bank account ownership as influenced by digital finance through the use of mobile phones in financial transactions. This study seeks to understand what influences individuals to have a bank account. Financial products and services could be easily available to a

number of people, but this becomes unworkable if not utilized by the intended recipient—the unbanked and underserved (Llanto & Rosellon, 2017). This research backs existing knowledge on financial inclusion in the country by investigating how digital finance influences financial inclusion through bank account ownership. Currently, the FIS only provides a surface-based picture of the current status of financial inclusion in the country; thus, in this study, a more analytical approach of the FIS will be employed through the use of regression analysis.

The research is presented as such: Section 2 postulates an in-depth literature on financial inclusion and its significant determinants. The section will also present a concise overview of the current state of financial inclusion in the Philippines. Section 3 discusses the data, the variables, and the methodology used in this study. Section 4 presents the results and interpretation of the regression analyses. Section 5 concludes.

## Literature Review

This section looks into the existing literature that discusses the significant factors that influence financial inclusion and the state of financial inclusion in the Philippines. First, this paper will review the onset of digital finance and financial technology and its potential role in financial inclusion efforts. This is where the focus of the study will be directed to and how it could be utilized towards financial inclusion strategies. Second, this paper will present the current condition of financial inclusion in the Philippines through the surface-level picture of the latest FIS data. It will highlight the significant socioeconomic characteristics, particularly gender, area type, and financial literacy, that are significant factors affecting financial inclusion. Finally, based on the discussion of the two subsections, this section will summarize the significance of using these variables in answering how they influence financial inclusion through bank account ownership.

### *Rise of Digital Finance and Financial Technology in Financial Inclusion*

As defined by the BSP, digital financial inclusion is the access to and use of proper financial facilities by the unserved and underserved population through

the use of technology. Digital financial inclusion has the world's attention due to the potential benefits of achieving inclusive development and finally reducing inequality in income (Lyman & Lauer, 2015). Because of its prospective benefits, the BSP has capitalized on technology to reach the underserved population, using it as a facilitator and enabler for financial inclusion. The BSP introduced a National Retail Payment System (NRPS) in 2015, an interconnected system that serves to create a protected, effective, and dependable electronic retail payment system. It has also formulated regulations, allowing local providers to give electronic banking services (Lopez, 2017). With the cooperation of the financial services industry, the first electronic wallet in the Philippines was introduced in 2001. Smart Money, the country's first form of electronic wallet, was launched that year in cooperation with one of the country's biggest retail bankers, Banco De Oro. G-Cash, another popular electronic wallet, launched shortly in 2004. Both of these electronic wallet services serve the majority of the country's population who had no access to more formal banking services.

After their introduction, banks and non-bank organizations have begun to provide e-financial assistance like e-banking and e-money requests (Lopez, 2017). As a result of these efforts, various financial services were made extensively accessible and inexpensive to millions of patrons through the use of technology (Llanto et al., 2018). Because of these projects, the Philippines ranked 5th in the promotion of financial inclusion, citing the country's initiative to broaden the availability of digital financial services (The Economist Intelligence Unit, 2019).

Despite this state of digitalization and technology in the financial services in the country, the existing literature still lacks comprehension of the increasingly significant position that digitalization in finance plays (Khera et al., 2021). To fill in the gap in the literature, this paper will concentrate on understanding financial inclusion in the context of digital finance. This research will examine how bank account ownership is influenced by the use of mobile phones in financial transactions as banks are beginning to use technology in providing financial services using mobile banking (Khera et al., 2021). Based on the evidence that a considerable segment of the unbanked uses and owns a mobile phone, digital finance would play an important role in delivering these necessary financial services

(Lyman & Lauer, 2015). Further, according to the Rural Bank Association of the Philippines, numerous rural banks are already integrating various financial services (such as ATM card services) with the use of mobile phones. Furthermore, various technology-supported channels such as point-of-sale (POS) terminals, aggregator payments, and small-scale staff are already deployed according to the Consultative Group to Assist the Poor (CGAP). Because of its rising importance in financial inclusion, the influence of digital finance will be the main core of this research. This study will analyze further the relationship between digital financial services and how they affect and influence financial inclusion through bank account ownership.

This paper also contributes to the literature that suggests that mobile phones have the capacity to encourage the unbanked sector of the population to use the various financial instruments available to them. Empirical research concerning the connection between mobile phones and access to financial services has seen considerable development, specifically among developing nations (Lay, 2018). However, based on the extent of the authors' knowledge, the majority of the current research is centered on African countries. The study by Lay (2018) contributes to the gap by looking only into Asian countries, specifically Thailand, Nepal, Cambodia, Myanmar, and Laos. This is where this research will fill the gap in the literature involving the Philippine context by looking into the influence of the use of mobile phones in financial transactions as its main independent variable.

### ***The Current Status and Determinants of Financial Inclusion in the Philippines***

Financial inclusion is mainly indicated by the proportion of the adult population that has a bank account (i.e., individual or joint) at any financial establishment such as banks, cooperatives, credit unions, microfinance institutions (MFI), or any mobile money provider (Llanto et al., 2018). Due to the country's small account penetration among the adult population, the Philippines has become among the frailest financial inclusion reach in the region, based on Demirgüç-Kunt et al. (2017) 2017 Global Findex Database. The 2019 FIS Report released by the BSP showed that only 28.6% of Filipino adults have account ownership with financial institutions (See Table 1).

**Table 1***Overall Account Penetration in the Philippines*

Year	Overall Account Penetration	Bank Account	Account with Microfinance NGO	E-money Account	Account with Cooperatives	Account with NSSLA
2019	28.60%	12.20%	12.10%	8.00%	1.70%	0.10%
2017	22.60%	11.50%	8.10%	1.30%	2.90%	0.30%

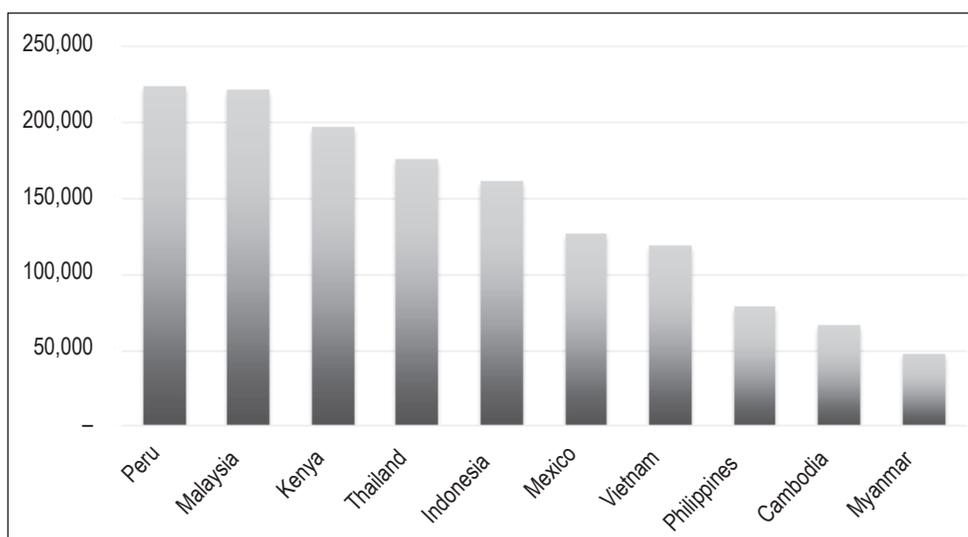
Source: BSP (2019)

Based on BSP (2019) Report on the State of Financial Inclusion in the Philippines in 2019, as compared to its peers, the Philippines lags behind the real use of formal financial services, as accounted by the number of deposit accounts owned. As shown in Figure 1, the country only registers 78,645 deposit accounts per 100,000 adults, a far cry from the ideal deposit account and adult ratio of 1:1.

There are two main indicators of financial products and services accessibility: the probability of owning a bank account and the use of this account to borrow and save (Llanto & Rosellon, 2017). Hence, in this research, bank account ownership will be employed as a representation of financial inclusion. Banks in the Philippines have already responded to the worldwide modernizations in the industry by introducing electronic banking (Llanto & Rosellon, 2017), which furthers this paper's motivation in pursuing additional research on the relationship between bank

account ownership and digital finance. The possible relationship between financial inclusion and digital finance may address the increasing clamor for more access to financial products and services.

Gender has been one of the critical factors considered in financial inclusion studies. In many regions of the world, women usually have a disadvantage over men when it comes to economic opportunities such as financial inclusion. This could be attributed to the numerous responsibilities of women in their households, making financial access the least of their priorities (Sioson & Kim, 2019). Using another person's bank account is another probable reason for women's low bank account ownership (Fanta & Mutsonziwa, 2016). Despite efforts on financial inclusivity and providing economic opportunities for women by having accounts at financial institutions, there is a persistent gender gap given the generalized role of women in society. However, this gender gap



Source: BSP (2019).

**Figure 1.** Deposit Accounts Per 100,000 Adults

phenomenon in financial inclusion, wherein women are highly likely to be unbanked compared to men, appears to be an exception in the Philippines.

The Philippines is among the developing nations that have more unbanked men than women, based on Demirgüç-Kunt et al. (2017) 2017 Global Findex Database. Based on the 2019 FIS Report, females have been more financially included than males in account ownership with a financial institution. However, there is a 3% gap in bank account ownership, with males owning more bank accounts than females. An interesting finding showed that there is a positive relationship between being a woman and financial inclusion indicators (Llanto & Rosellon, 2017). This implies that women are highly likely to make use of formal financial institutions and make use of their services as compared to men. Given this significant exception to the existing knowledge of the gender gap in the study of financial inclusion, the Philippines presents an interesting case—an inverse gender gap in financial inclusion indicators. As such, this paper will further study this phenomenon by focusing on the association of gender with being financially inclusive through digital finance.

One of the main indicators of financial inclusion is access. To understand and gauge the range of access to the various financial instruments, it is necessary to look into the probable obstacles to access. This includes the cost of access and even proximity to available service providers (Llanto & Rosellon, 2017). The Philippine geographical setting, being archipelagic in nature, proves that access to financial services remains difficult. Demirgüç-Kunt et al. (2017) mentioned that distance remains to be an obstacle to the adult population in the Philippines deprived of an account, saying that financial providers are far away. The top three regions that have the biggest segment of banking offices (55.0%) and ATMs (62.0%) are from the highly urbanized regions in the country. The lowest three regions that collectively held a meager percentage segment in the aggregate number of banking offices and ATMs in the country are rural regions (See Table 2). As such, this becomes a perennial barrier, leaving the population unbanked and without access to financial institutions. Data shows (see Table 2) that bank concentration is mainly in highly urbanized and densely populated areas of the country. The high cost of building and operating brick-and-mortar bank branches, their expensive maintenance, especially in

hard-to-reach areas in the interior and uplands, and the costly travel faced by rural customers to urban areas where financial institutions choose to locate their branches can explain why urban areas are prioritized (Llanto et al., 2018). Given this observation, this paper can further look into this and provide a new perspective in relation to the growth of digital finance. Financial inclusion strategies can further take advantage of technology to increase financial access in these hard-to-reach areas. Current data shows that nonurbanized areas have a marginally bigger account penetration rate of 30.0% compared to the urban population of 27%, contrary to the 2017 gap in support of the urbanized areas. This paper will dig deeper into the current FIS data and determine if area type, whether living in an urban or rural area, proves to be a significant factor in determining financial inclusion.

Financial literacy is another significant factor that determines financial inclusion (Llanto & Rosellon, 2017). As defined in the 2019 FIS Report, financial literacy is the understanding of existing financial products and services and the aptitude to utilize these instruments to administer a person's financial resources. Financial literacy should also include the understanding of financial concepts that revolve around the various financial products and services. The 2019 FIS Report shows that adults in the Philippines are able to answer 1 out of 3 financial-related questions correctly. About 55% of these adults have comprehension on concepts such as inflation, 33% were able to correctly answer concepts such as simple and compound interest, while only 8% got all three questions correctly on financial literacy related questions.

Among all adults worldwide, only 33% are said to have adequate financial understanding. This means that they are able to comprehend at least 3 out of 4 financial literacy concepts (inflation, risk diversification, etc.), which allows them to make sound financial decisions (Klapper & Lusardi, 2020). Increased financial literacy also plays an important role, as well-informed individuals are more likely to trust banks and financial services (Barajas et al., 2020). The problem lies in how financial literacy and its influence on financial inclusion is measured. It was only during the conduct of the 2019 FIS Report that financial literacy questions were introduced. This data that involves financial literacy as a new angle in investigating financial inclusion is included in this study, a novel approach compared to the previously descriptive findings.

**Table 2***Regional Distribution of Banks and ATMS in the Philippines*

Region	Banks			ATMs		
	2018	2019	2018-19 Growth	2018	2019	2018-19 Growth
NCR	3,739	3,826	2.30%	8,210	8,248	0.50%
CAR	186	197	5.90%	288	297	3.10%
I Ilocos Region	621	650	4.70%	711	738	3.80%
II Cagayan Valley	425	465	9.40%	448	462	3.10%
III Central Luzon	1,286	1,341	4.30%	1,989	2,075	4.30%
IV-A CALABARZON	1,825	1,872	2.60%	3,167	3,182	0.50%
IV-B MIMAROPA	292	302	3.40%	296	314	6.10%
V Bicol Region	499	532	6.60%	579	629	8.60%
VI Western Visayas	704	735	4.40%	1,018	1,062	4.30%
VII Central Visayas	855	897	4.90%	1,606	1,663	3.50%
VIII Eastern Visayas	259	286	10.40%	379	420	10.80%
IX Zamboanga Peninsula	238	261	9.70%	341	359	5.30%
X Northern Mindanao	407	430	5.70%	607	645	6.30%
XI Davao Region	470	493	4.90%	853	856	0.40%
XII SOCCSKSARGEN	275	293	6.50%	444	463	4.30%
XIII Caraga	216	222	2.80%	297	316	6.40%
BARMM	19	18	-5.30%	42	48	14.30%
Philippines	12,316	12,820	4.10%	21,275	21,777	2.40%

Source: BSP (2019)

This paper seeks to contribute through the analysis of financial literacy using the knowledge of concepts of inflation and interest rate as factors that determine financial inclusion. The findings of Koomson et al. (2020) presented that adequate training in various financial-related terms drastically influenced the number of account ownership. This follows that financially literate individuals are highly probable to be financially inclusive. Financial knowledge is considered to be among the most persuasive elements that improve financial inclusion. Hence, it is projected to have an important influence, particularly in the promotion of financial communication among rural and low-income individuals (Koomson et al., 2020). By examining the new financial literacy data from the FIS in this study, the promotion of financial literacy programs may be encouraged to reach the underserved and unbanked communities.

### ***Dynamics of Financial Inclusion***

Financial inclusion is often measured by the access to financial products and services by means of bank account ownership. Interestingly, the determinants identified as variables in this study are interrelated and show a significant influence on financial inclusion, as presented in the study of Llanto and Rosellon (2017). The study revealed the association of sociodemographic characteristics with access to numerous financial products and services. Consequently, it is expected in this research that these variables will show a significant relation with the dependent variable, which is bank account ownership.

The research question that this study aims to answer is how digital finance through the use of mobile phones in financial transactions influences the bank account ownership of Filipinos. This is inspired by the position of digital financial services as the main catalyst for

a financially included society (Llanto et al., 2018). According to Ozili (2018), digital finance may promote an extensive financial inclusion environment, expanded financial services, particularly to the unbanked portion of the population, and the enlargement of essential facilities to individuals. These claims are based on the fact that about 50% of people in developing economies have a mobile phone (Ozili, 2018). This paper will answer the gap in existing literature with the utilization of digital finance through the use of mobile phones for financial transactions as its main independent variable in this study.

This research will also explore the novelty of financial literacy data in the 2019 FIS Report in further explaining what determines and influences financial inclusion. Financial literacy through financial education is important in accessing various financial products and services (Llanto & Rosellon, 2017). Financial literacy is an inseparable part of digital finance (Klapper & Lusardi, 2020), and the new data on financial literacy will result in a newer understanding of the influence of financial inclusion.

Furthermore, a prior study on financial inclusion by Llanto and Rosellon in 2017 used the data from the National Baseline Survey on Financial Inclusion to understand this field. This study, however, will utilize the FIS data in a more analytical approach, which has not been widely used in known literature, as to the knowledge of the authors. This research will use logistic regression analysis on the chosen variables in this study to provide an in-depth analysis of the FIS data as compared to the current level of discourse, which only presents a surface-level picture of the state of financial inclusion. This will be further discussed in the next chapter.

## Methods

### *Data Source*

This study used the 2019 FIS survey, specifically the financial inclusion data. FIS is a nationally encompassing survey used to acquire financial inclusion data from both users and non-users of various financial products and services. The survey instrument was devised by the BSP Center for Learning and Inclusion Advocacy (CLIA). The final survey was accepted by the Philippine Statistics Authority (PSA). In total, the FIS conducted surveys from over 1,200

adults (15 years old and above) all over the country by means of a multi-stage probability sampling. For the interviewees in the field, Computer-Assisted Personal Interviewing (CAPI) was overseen with the help of questionnaires and mobile devices during personal interviews. The entire data gathering, encoding, and treating were accomplished by Nielsen Philippines.

### *Variables Adopted*

The dependent variable in this research is bank account ownership. It is defined as a savings or current account opened in either universal, commercial, thrift, rural, or cooperative banks. Two of the most common variables used to indicate the accessibility of financial products and services are the probability of having a bank account and the use of that account for basic transactions such as saving and borrowing (Llanto & Rosellon, 2017). Empirical studies conducted on financial inclusion show that bank account ownership proves to be an excellent indicator of being financially included. Hence, the usage of bank account ownership as the dependent variable in this study serves as a proxy for being financially included.

The main independent variable chosen for this study is the use of mobile phones for financial-related transactions. Financial transactions include but are not limited to, transfers, bill payments, and sending or receiving money. Because a significant portion of the unbanked population owns a mobile phone, digital finance could be used as a catalyst for financial inclusion. Facilitating financial services by using mobile phones and other similar devices may increase access to various financial services specifically for the financially excluded (Lyman & Lauer, 2015). Hence, this research utilizes this variable to understand how digital finance can potentially affect and influence the ownership of bank accounts in the Philippines through the use of mobile phones for financial transactions.

Other explanatory independent variables chosen in this study are socioeconomic characteristics such as gender, area type, and financial literacy, all of which are related considerably to access to different financial products and services (Llanto & Rosellon, 2017). The gender gap phenomenon in the financial inclusion landscape in the Philippines proves to be an exception where women are more likely to have an account than men (Demirguc-Kunt et al., 2017). Thus, it is important to further investigate this exception using the FIS 2019 data. Distance to the physical branches of

financial institutions has become a persistent problem encountered by the unbanked and unserved population in the country. By including area type (urban or rural) as an independent variable, we can further understand its impact on financial inclusion access. The measure of financial literacy was first introduced in the 2019 FIS by evaluating the respondents' comprehension of financial terms such as interest and inflation. This innovative consideration of respondents' knowledge is still new in the field of financial inclusion; hence, it is included in this research as one of the independent

variables. Its possible influence on financial inclusion through bank account ownership may contribute further to studies of financial inclusion in the Philippines.

The dependent and independent variables of this research were subjected to various regression runs to identify the significant determinants of bank account ownership in the Philippines. By subjecting the data to rigorous experimentation, we can determine the magnitude and the direction of the relationship among these variables. The dependent and independent variables are summarized in Table 3

**Table 3**

*List of Variables*

Variable	Description
Bank Account Ownership (Dependent)	Dummy: 1 if the respondent has a bank account, 0 otherwise.
Use of Mobile Phone for Financial Transaction (Main Independent Variable)	Dummy: 1 if the respondent uses his/her mobile phone for financial transactions, 0 otherwise.
Gender - Female (Independent Variable)	Dummy: 1 if the respondent is female, 0 if male.
Area Type - Rural (Independent Variable)	Dummy: 1 if the respondent lives in an urban area, 0 if the respondent lives in a rural area.
Financial Literacy - Inflation (Explanatory Independent Variable)	Dummy: 1 if the respondent answered the question on inflation correctly, 0 if otherwise.
Financial Literacy – Interest Rate (Explanatory Independent Variable)	Dummy: 1 if the respondent answered the question on interest rate correctly, 0 if otherwise.

### **Empirical Model**

The 2019 FIS, although extensively done, still presents a one-dimensional understanding of Filipinos' current state of financial inclusion. This research uses FIS data and subjects these statistics to a more stringent probing, which is the regression analysis. Regression analysis is the study of the relationship of dependent variables with one or more independent variables. It aims to estimate and predict the average score of the dependent variables based on the known independent variable scores. Because the data used in this research are dichotomous in nature, binary logistic regression analysis or a logit model was utilized to explain the association among both the dependent and independent variables. Generally, a logistic function (Sahoo & Gomkale, 2015) is described as:

$$Li = P(y=1|x) = \text{Log}[Pi / (1-Pi)] = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon \quad (1)$$

Where  $Pi / (1-Pi)$  equals the odds ratio of the probability of success to the probability of failure,  $Pi$  equals the probability of success or probability of existence of a characteristic, and  $1-Pi$  equals the probability of failure or probability of absence of characteristic. The odds ratio in a logit model could be presented as:

$$[Pi / (1-Pi)] = \exp(\beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon) \quad (2)$$

given that it is an exponential function of the X variables, indicates the linearization through the logarithm of the odds ratio.

$$\log[P_i / (1 - P_i)] = (\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon) \quad (3)$$

Equation 3 is considered a logit or logistic function. This was measured in situations where the dependent variable is binary or taking two possibilities of incidence.  $P(y=1|x)$  means the probability that y takes the value 1 (success) and hence 0 is otherwise (failure). Following the logit model in Equation 3, this research study is estimated to have the following model:

$$P(\text{Bank} = 1|x) = \text{Log}[P_i / (1 - P_i)] = \beta_0 + \beta_1 \text{Mobile} + \beta_2 \text{Female} + \beta_3 \text{Urban} + \beta_4 \text{Inflation} + \beta_5 \text{InterestRat} + \varepsilon \quad (4)$$

where y is a binary variable,

$Y = \text{Bank} = 1$  if a person owns a bank account and  $=0$  if otherwise;

$X_1 = \text{Mobile (dummy)} = 1$  if the person uses mobile phone for financial transactions or 0 if otherwise;

$X_2 = \text{Female (dummy)} = 1$  if the person is female or 0 if otherwise;

$X_3 = \text{Urban (dummy)} = 1$  if the person lives in an urban area or 0 if otherwise;

$X_4 = \text{Inflation (dummy)} = 1$  if the person correctly answered the question on inflation, or 0 if otherwise; and

$X_5 = \text{Interest Rate (dummy)} = 1$  if the person correctly answered the question on interest rate, or 0 if otherwise.

To further investigate the effects, this study will also employ interaction variables to determine the different effects on the outcome variable. Given that in the existing literature on financial inclusion, the chosen explanatory independent variables in this research are significant and may be affected by the values of the other independent variables. This extra level of analysis allows this study to present more robust findings.

## Results

### *Logistic Regression Models*

The general findings are summarized into a few points. First, using mobile phones for financial transactions proved to be a highly significant determinant for bank account ownership, showing a positive relationship between the two variables. The marginal average effect of 23.0% is the highest among the independent variables used in the study. This suggests that those who use mobile phones for their various financial transactions see this medium as an element in owning a bank account. Second, urbanity is statistically significant on a 10% level and has a positive relationship with bank account ownership. This could imply that living in an urban area increases the possibility of owning a bank account. Finally, financial literacy, as measured by the interest rate, is highly significant and shows a positive relationship with bank account ownership. Overall, these results are similar across all the logistic models used in this research.

Table 4 presents the results of the logistic regression. Column 1 presents the baseline results using only the main independent variable in the regression run. Columns 2, 3, and 4 are the models with one explanatory independent variable excluded from the model (Gender, Area Type, and Financial Literacy, respectively). Column 5 contains the regression run result with only the interest rate as the factor for financial literacy. Finally, column 6 contains the results for simulations that employ all the explanatory independent variables.

**Table 4***Logistic Regression Model Results*

<b>Bank Account Ownership</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>t-test</b>
Mobile Use for Fin. Transaction	0.221 (0.051)	0.228 (0.050)	0.23 (0.050)	0.224 (0.051)	0.231 (0.050)	0.23 (0.050)	*
Gender - Female			-0.023 (0.021)	-0.022 (0.021)	-0.022 (0.021)	-0.023 (0.021)	
Area Type - Urban		0.035 (0.021)	0.036 (0.021)	0.035 (0.021)	0.035 (0.021)	0.035 (0.021)	**
Fin Literacy - Inflation		-0.003 (0.021)	-0.003 (0.021)			-0.001 (0.021)	
Fin Literacy - Interest Rate		0.118 (0.024)	0.119 (0.024)		0.119 (0.024)	0.119 (0.024)	*
Observations	1200	1200	1200	1200	1200	1200	
Log Likelihood	-537.745	-523.142	-523.894	-535.841	-522.566	-522.564	

Notes: Figures in parenthesis are standard errors; \* Significant at 1% level of significance; \*\* Significant at 10% level of significance.

**Table 5***Logistic Regression With Interaction Variable Model Results*

<b>Bank Account Ownership</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>t-test</b>
Mobile Use for Fin. Transaction	0.229 (.050)	0.230 (.050)	0.230 (.050)	0.230 (.050)	0.230 (.050)	*
Gender - Female	-0.023 (0.021)	-0.023 (0.021)	-0.023 (0.021)	-0.023 (0.021)	-0.023 (0.021)	
Area Type - Urban	0.035 (0.021)	0.035 (0.021)	0.035 (0.021)	0.035 (0.021)	0.035 (0.021)	**
Fin Literacy - Inflation	-0.001 (0.021)	-0.001 (0.021)	-0.001 (0.021)	-0.001 (0.021)	-0.002 (0.021)	
Fin Literacy - Interest Rate	0.119 (0.024)	0.117 (0.024)	0.118 (0.024)	0.118 (0.024)	0.119 (0.024)	*
Gender#Mobile Use	0.159 (0.466)					
Urbanity#Mobile Use		0.277 (0.471)				
Urbanity#Gender			-0.242 (0.317)			
Gender#Financial Literacy-Inflation				0.083 (0.317)		
Gender#Financial Literacy-Interest Rate					0.259 (0.317)	
Observations	1200	1200	1200	1200	1200	
Log Likelihood	-522.506	-522.390	-522.272	-522.530	-522.230	

Notes: Figures in parenthesis are standard errors; \* Significant at 1% level of significance; \*\* Significant at 10% level of significance.

### ***Logistic Regression Models With Interaction Variables***

This subsection discusses the findings of the logistic regression models with the inclusion of interaction variables. Interaction variables were included to fully understand the relationship between the employed independent variables in this research. The general observations show that the inclusion of interaction variables does not impact or affect the second regression run. The level of significance of the independent variables remains the same across all the models with interaction variables compared to the original logistic regression models without interaction variables.

## **Discussion**

Previous studies have already taken into account the role of digitalization and technology in achieving a financially inclusive society. Banks are the forefront utilizers of technology by incorporating it in their delivery of financial services (Khera et al., 2021). This research investigated the influence of digital finance on the bank account ownership of Filipinos. Using bank account ownership as the dependent variable, we tested this relationship vis-à-vis other relevant independent variables. The findings show a positive relationship between our dependent variable and the use of mobile phones in financial transactions.

Through logistic regression analysis, results revealed that there is a 23.0% likelihood for a person who uses their mobile phone for financial transactions to own a bank account. This result showed a higher likelihood for Filipinos to access financial services by using their mobile phones as compared to the findings of Lay (2018) in his research. Based on the 2019 FIS, 69% of adults have a mobile phone, and 75% of mobile phone owners own a smartphone. Thus, given this significant number, the likelihood of influencing bank ownership is feasible as mobile phones can be used for financial transactions and account opening. Based on the empirical findings of Lay (2018), the likelihood of utilizing banking services by having a mobile phone in Cambodia, Laos, Myanmar, Nepal, and Thailand is 4.8%, 9.3%, 2.7%, 10.6%, and 10.4%, respectively. This is also in line with the conclusions of Llanto et al. (2018) that the use of technology in different financial-related dealings or e-finance has

increased the accessibility of these financial services.

Further, the result of this study affirms the high ranking of the Philippines in the Economist Intelligence Unit (2019) Global Microscope study, citing the country's works in endorsing financial inclusion through the use of expanded digital financial services. It also affirms the thrust of the BSP of capitalizing on digital inclusion through policies that promote digitalization in reaching the unbanked members of society.

In the regression models used in this study, the results find no relationship between bank account ownership and gender. The contradictory findings in this paper compared to existing literature could possibly come from the phenomenon in the Philippines, where women are highly likely, compared to men, to own an account based on the Global Findex Database 2017. In the first half of the manuscript, we highlighted the disadvantages of women when it comes to economic opportunities, and this is prevalent in developing countries except the Philippines. In the Philippine context, men are less financially included compared to women. The FIS 2019 surface-level data also shows a minimal difference of 3.1% in bank account ownership between men and women. Based on the 2017 Global Findex Report, the Philippines is recognized as one of the few emerging economies that shows that women's access to financial services exceeds that of men.

This exception in the Philippine context may rationalize the regression result of the study, showing the insignificance of gender as an explanatory variable to bank account ownership. Gender does not necessarily influence whether a person will open a bank account or not, as in the case of the Philippines.

Urbanity as an explanatory variable was a significant determinant in having a bank account. With a 10% level of confidence, there is a 3.5% likelihood for a person living in an urban area to own a bank account. The findings of this study are in parallel with the existing literature, pointing out that isolated areas do serve as an obstacle for consumers to use banks and other banking institutions (Llanto & Rosellon, 2017). This research contributed to the existing knowledge that distance to financial service providers remains a potential barrier to financial inclusion. Another study points out that distance serves as an obstacle for numerous adults in the Philippines sans an account (Demirgüç-Kunt et al., 2017). Data included in the FIS 2019 report also presents that the bank density is concentrated mainly

in the extremely urbanized and heavily inhabited areas of the Philippines, further supporting the results of this study. These studies justify the same result that is presented in this research. A possible explanation for the significant relationship between urbanity and bank account ownership, as viewed from the Philippine setting, is the country's archipelagic nature. The usual brick-and-mortar office of banks may be too costly to build and maintain in far-flung rural areas. Due to the archipelagic nature of the country, transportation infrastructure still remains an obstacle to accessing actual banking institutions.

Financial literacy on interest rates is a significant factor in bank account ownership based on the results of the regression analyses in this research. The probability of having a bank account is 11.9% higher if an individual is financially literate on basic banking concepts such as interest rates. This result is consistent with existing literature affirming that education about financial literacy considerably influenced account ownership (Koomson et al., 2020), and access to finance is positively impacted by financial literacy (Hasan et al., 2021). Also, a possible rationalization of this is the association of bank accounts with interest rates. Saving accounts incur earnings through interest rates; thus, if one is knowledgeable on this aspect, there is a significant likelihood of having a bank account to take advantage of the chance to increase principal savings. Financial literacy in consideration of inflation, on the other hand, poses no relationship and significance in owning a bank account. Intuitively, this could possibly be due to the direct non-relation between the knowledge of inflation and opening a bank account. Moreover, because of the nature of inflation, which is the increase in the rate of the general prices of goods and services, the knowledge of this aspect might deter a person from opening an account. Opening a bank account entails savings, and with the general increase in prices, the person would rather not deposit in a bank account due to fund insufficiency or fear of opportunity costs.

The findings of this study highlight the significance of mobile phones as a medium to facilitate financial transactions. The advent of digitalization and technology made basic financial transactions possible even without the presence of traditional brick-and-mortar financial institutions. This study also highlights the area, whether urban or rural area, as a barrier to accessing financial services offered by these

banks. Lastly, basic financial knowledge, such as the comprehension of interest rates, matters to people. This only confirms that basic comprehension of banking terms affects people's decision to participate or steer away from utilizing the various available financial services. Bank account savings accrue interest earnings; thus, if there is knowledge of interest rates and their benefits, it increases the likelihood of owning a bank account.

## Conclusion

The novel approach of this research was using the FIS data and elevating the findings from a perfunctory discourse to a more rigorous analysis of the current state of financial inclusion in the country. Through this study, we were able to investigate financial inclusion data in a more analytical method, thereby producing policy recommendations that are up-to-date and grounded on solid evidence. The outcomes of this research offered several insightful findings. First, the study revealed that digital finance through the use of mobile phones in financial transactions influences the bank account ownership of Filipinos. This research confirms the study of Llanto et al. (2018) that digital finance could have a significant role in paving the way for a more comprehensive financial environment targeted to the unbanked and unserved members of society. Second, sociodemographic characteristics, particularly the area type (urban and rural) and financial literacy (as measured by the interest rates), significantly affect bank account ownership. As shown in this research, the BSP's financial literacy efforts proved to be effective as financial literacy demonstrates beneficial effects in creating a more financially inclusive society.

In terms of policy implications, this study led to certain valuable suggestions that would allow the enhancement and possible revamp of current financial inclusion initiatives. Current policies could incorporate significant variables (e.g., mobile phones, urbanity, etc.) in crafting financial inclusion programs. Rather than casting a wide net to educate the Filipino masses, a more specific, tailor-made approach could be considered. For example, because gender is not seen as a significant determinant of bank account ownership, the burden of financial education (such as house budgeting and personal finance) should be stressed on both genders (as opposed to the preference over one

gender). Also, policies concerning the promotion of digitalization and technology should be encouraged in banking institutions as opposed to the still rampant over-the-counter transactions. A significant number of unbanked people have in their possession a mobile phone, and giving financial services through these mediums would increase the accessibility to various financial services (Lyman & Lauer, 2015). In this regard, the development of mobile banking services and reach should be highlighted to encourage people to avail of financial products and instruments. This could be cost-effective for financial institutions by lessening the cost of branching, and people can access financial services through their mobile phones. Crafting of banking and financial institutions regulations may anchor the promotion of mobile banking and digital finance. Regulatory incentives may be granted to banks or financial institutions to further encourage them to provide a wide range of access to people. Furthermore, enhancement of the infrastructure should be in place to support and service this demand for digital finance. The establishment of operations of financial institutions such as banks in rural and far-flung areas should be encouraged, more so incentivized. Individuals residing in urban locations are highly probable to have a bank account, as revealed in this study. Programs and policies that could support institutions in bringing financial products and services closer to the people should be supported. This includes pioneering agendas that enable financial products and services to spread to different rural communities. Rural households remain to be the largest unserved and unbanked market due to the lack of infrastructure. Another one is that the reach of financial literacy programs should be aggressively widened. One notable result of this is that knowledge of interest rates increases the probability of an individual having their own account. Policymakers may tap educational institutions to include financial literacy subjects in their curriculum for the youth to be aware and knowledgeable about financial products and services. Further, with the novelty of financial literacy in the conduct of the FIS, consideration of including more questions in the survey to determine this factor is advised to better understand and analyze this aspect.

Despite the significant empirical findings and analyses made in this research, it also has its limitations. Because financial inclusion was analyzed using only and exclusively bank account ownership as the paper's dependent variable, further studies are

encouraged to focus on other account ownership with financial institutions like microfinance, cooperatives, and e-money, among others. Furthermore, with the importance of the influence of digital finance in the state of financial inclusion, low digital adoption rate and internet connection (Llanto et al., 2018) still pose a hindrance towards complete financial inclusion. With this, it can be further examined, specifically on how these structural predicaments influence digital finance. This would be a beneficial addition to financial inclusion literature because there are still various niches in the financial inclusion literature that need to be addressed, specifically among the yet developing nations.

### **Declaration of Ownership**

This report is our original work.

### **Conflict of Interest**

None.

### **Ethical Clearance**

This study was approved by our institutions.

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