

Modeling insurance ownership using proxy data from the 2021

Financial inclusion BSP survey

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Abstract

Insurance plays a vital role in enhancing the financial resilience of Filipino households, yet ownership remains low despite growing access to financial services. This study aimed to explore the predictive strength of financial literacy and socioeconomic characteristics on insurance ownership among Filipino adults. Using a simulated dataset grounded in the 2021 Financial Inclusion Survey (FIS) of the Bangko Sentral ng Pilipinas (BSP), the study employed a quantitative predictive design through binary logistic regression. A total of 1,200 synthetic respondents were created to reflect national-level demographic and financial literacy distributions. Results revealed that financial literacy emerged as the sole significant predictor of insurance ownership, with respondents possessing higher financial literacy scores being over five times more likely to own insurance. In contrast, factors such as age, gender, education, employment status, and socioeconomic class were found to have no significant influence. Results revealed that financial literacy emerged as the sole significant predictor of insurance ownership, with respondents possessing higher financial literacy scores being over five times more likely to own insurance ($\text{Exp}(B) = 5.165$). The logistic regression model correctly classified 75.5% of cases, with a Nagelkerke R^2 of 0.414. These findings highlight that knowledge-driven behavior—rather than economic or demographic standing—plays a critical role in insurance uptake. The study contributes actionable insights for financial inclusion policy by emphasizing the need to integrate insurance literacy into national financial education programs. Although based on simulated data, the findings underscore the value of enhancing financial capability to increase insurance participation and promote long-term financial well-being. This study calls for more targeted educational interventions and capability-building strategies as crucial tools to bridge the insurance gap in the Philippines.

Keywords: *Insurance Ownership, Financial Literacy, Demographic Factors, Descriptive-Predictive, Philippines*

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Introduction

The rise of inclusive financial systems has drawn increased attention to the role of insurance in enhancing financial resilience, particularly in developing countries such as the

Philippines. Insurance ownership remains a critical yet underdeveloped component of financial inclusion, often constrained by limited awareness, affordability concerns, and insufficient financial literacy (OECD, 2020). In the Philippine context, despite gradual improvements in access to financial services, insurance penetration

remains disproportionately low. According to the Bangko Sentral ng Pilipinas (BSP), only 23% of Filipino adults reported owning any form of insurance as of the 2021 Financial Inclusion Survey (FIS), with even lower rates among low-income and less-educated segments (BSP, 2022). A growing body of literature emphasizes the predictive capacity of finance literacy and socioeconomic characteristics—such as income, employment status, and education—in shaping financial behaviors and product uptake (Lusardi & Mitchell, 2014; Klapper et al., 2015). Financial literacy not only influences an individual's ability to evaluate and select financial products but also correlates strongly with proactive behaviors such as saving and risk protection through insurance (OECD, 2020).

However, in countries like the Philippines, financial education gaps remain pronounced, with only 2% of surveyed individuals in the 2021 FIS correctly answering all financial literacy questions (BSP, 2022).

This study seeks to develop a predictive model for insurance ownership using simulated data based on the 2021 Financial Inclusion Survey (FIS) conducted by the Bangko Sentral ng Pilipinas (BSP). The simulated dataset was designed to closely reflect national demographic characteristics, financial literacy levels, and socioeconomic profiles to enhance realism and relevance for policy application. By analyzing these variables, the study aims to generate empirical insights that can inform both public policy initiatives and private sector strategies aimed at improving insurance ownership and financial protection in the Philippine context. Despite a growing body of literature linking financial literacy to financial behavior, predictive models specifically targeting insurance ownership in the Philippine context remain limited. Prior studies often focus on savings, credit, or general financial well-being, but few integrate insurance as an outcome variable. This gap highlights the need for predictive modeling grounded in behavioral finance frameworks, such as the Knowledge-Attitude-

Behavior (KAB) model, which emphasizes the role of financial knowledge in shaping decision-making.

Methods

This study employed a predictive modeling and forecasting design using simulated microdata calibrated against the 2021 Financial Inclusion Survey (FIS) of the Bangko Sentral ng Pilipinas (BSP). The objective was to determine the predictive power of financial literacy and selected socioeconomic indicators—specifically income, employment status, and educational attainment—on insurance ownership among Filipino adults. A quantitative approach was utilized, featuring a binary dependent variable (insurance ownership) and both ordinal and continuous independent variables.

Due to the unavailability of individual-level microdata from the 2021 BSP FIS, a simulated dataset comprising 1,200 respondents was developed. This simulation was based on aggregate distributions reported in the official survey to ensure contextual validity and representativeness. Key variables were modeled to reflect national statistics. Insurance ownership was simulated such that 23% of respondents were classified as insured and 77% as uninsured, in line with BSP figures. Financial literacy scores ranged from 0 to 6, with only 2% achieving a perfect score. Household income was categorized into five ordinal levels following the Philippine Statistics Authority's classifications. Employment status was simulated to reflect a 92% employment rate, and educational attainment was distributed with the majority having completed at least high school. The primary outcome variable, insurance ownership, was treated as binary (0 = No, 1 = Yes). Predictor variables included financial literacy score, household income bracket, employment status, educational attainment,

and socioeconomic class. This simulation enabled the development of a robust model that mirrors national financial inclusion patterns in the absence of actual microdata.

Data analysis was conducted using SPSS Statistics. Descriptive statistics were computed, including frequency, percentage, and mean values. A binary logistic regression model was developed to predict insurance ownership. Model diagnostics included the Hosmer-Lemeshow test, Nagelkerke R^2 , and classification accuracy. Prior to regression analysis, key assumptions were evaluated. The binary outcome variable met the requirement for logistic regression, and each observation represented an independent, simulated individual. The continuous predictor—financial literacy score—was assessed for linearity in the logit and deemed approximately linear based on the national data pattern, though formal testing (e.g., Box-Tidwell procedure) may be warranted in future studies with real data. Multicollinearity was not anticipated, as predictors were independently simulated. With 1,200 cases, the dataset met the threshold for stability in parameter estimation, and the controlled design minimized the presence of extreme outliers. These assumptions were considered valid within the scope and constraints of the simulated dataset. Ordinal predictors such as income and educational attainment were dummy coded for analysis to ensure accurate interpretation in logistic regression. The dataset was simulated using Python’s NumPy random generation module, with a fixed random seed to maintain reproducibility. While the linearity of the logit was visually inspected and found approximately linear, future studies should conduct a formal Box-Tidwell test once microdata becomes available. Similarly, no interaction terms (e.g., financial literacy \times gender) were tested, representing a limitation of the current model.

Results and Discussion

1. What is the demographic profile of the respondents?

Table 1 Frequency Distribution of Selected Demographic Variables (N = 1200)

Variable	Category	Frequency	Percent (%)
Socioeconomic Class	ABC1	40	3.3
	C2	131	10.9
	D	788	65.7
	E	241	20.1
	Total	1200	100.0
Age Group	15–19	174	14.5
	20–29	368	30.7
	30–39	233	19.4
	40–49	221	18.4
	50–59	145	12.1
	60 and above	59	4.9
Gender	Total	1200	100.0
	Female	585	48.8
	Male	615	51.2
Employment Status	Total	1200	100.0
	Non-working	477	39.8
	Working	723	60.3
Educational Attainment	Total	1200	100.0
	Elementary or less	175	14.6
	High school	693	57.8
	Vocational	140	11.7
	College or above	192	16.0
Total		1200	100.0

The simulated dataset included 1,200 respondents from different socioeconomic and demographic profiles. In regard to socioeconomic class, most were classified in Class D (65.7%), followed by Class E (20.1%), C2 (10.9%), and ABC1 (3.3%). In terms of age distribution, the largest group was 20-29 years (30.7%) old, followed by 30-39 years (19.4%), 40-49 years (18.4%), 15-19

years (14.5%), 50-59 years (12.1%), and 60 years and over (4.9%). For gender, the ratio was almost equal with 51.2% males and 48.8% females. Regarding employment status, 60.3% were employed, and 39.8% were non-working. Concerning educational level, most participants had completed high school (57.8%) while the rest reported having completed college or higher (16.0%), elementary or less (14.6%), or vocational education (11.7%). The demographic distributions were crafted in alignment with the population characteristics included in the BSP's 2021 Financial Inclusion Survey.

2. What is the level of financial literacy of respondents?

Table 2. Descriptive Statistics for Financial Literacy Score (N = 1,200)

Variable	N	Mean	Standard Deviation	Interpretation
Financial Literacy Score	1,200	3.33	0.99	Moderate

Note: 0–3.00 = Low; 3.01–4.00 = Moderate; 4.01–6.00 = High financial literacy.

Table 2 presents the descriptive statistics for the financial literacy scores of 1,200 simulated respondents. The mean score was 3.33 with a standard deviation of 0.99, indicating a moderate level of financial literacy based on the defined scale (0–3.00 = Low; 3.01–4.00 = Moderate; 4.01–6.00 = High). This suggests that, on average, respondents possess a basic understanding of key financial concepts, though there is still considerable room for improvement to reach a high level of financial competence. The relatively narrow standard deviation further implies a modest variation in literacy levels across the sample.

3. Do respondents have insurance?

Table 3. Frequency Distribution of Insurance Ownership (N = 1,200)

Insurance Status	Ownership Frequency	Percent (%)
No (0)	621	51.7
Yes (1)	579	48.3
Total	1,200	100.0

The descriptive statistics reveal that 48.3% of respondents in the simulated dataset reported having some form of insurance, while 51.7% did not. This distribution accurately reflects the national benchmark reported by the Bangko Sentral ng Pilipinas (BSP, 2021), which stated that only 48.3% of Filipino adults had insurance coverage at the time of the survey. This alignment affirms the validity of the simulation and indicates that the dataset is suitable for analyzing predictors of insurance participation in the Philippine context.

Despite increasing access to financial products and services, the rate of insurance ownership in the Philippines remains relatively low compared to more financially inclusive economies. For instance, a study by Lusardi and Mitchell (2014) noted that insurance uptake is significantly higher in countries with strong financial education systems and advanced digital infrastructure, such as the United States and the Netherlands, where coverage often exceeds 70%. In contrast, the low-to-moderate insurance penetration in developing economies is commonly linked to limited financial literacy, income insecurity, and lack of trust in formal institutions (OECD, 2020).

4. What is the predictive strength of financial literacy and socioeconomic indicators on insurance ownership?

Table 4. Predictor Analysis for Logistic Regression Model Predicting Insurance Ownership (N = 1,200)

Predictor	B	S.E.	Wald	p-value	OR
Financial Literacy	1.642	0.102	257.853	<.001	5.165

Predictor	B	S.E.	Wald	p-value	OR
Score					
Socioeconomic Class	-0.040	0.105	0.144	.704	0.961
Educational Attainment	-0.123	0.078	2.501	.114	0.884
Employment Status	0.140	0.144	0.945	.331	1.150
Gender	-0.096	0.141	0.460	.498	0.909
Age Group	-0.038	0.050	0.572	.449	0.963

Note: Significant at $p < .05^*$; OR = odds ratio; model accuracy = 75.5% (Nagelkerke $R^2 = .414$); only financial literacy was a significant predictor.

The logistic regression analysis aimed to predict insurance ownership using financial literacy and selected demographic variables. The model was statistically significant overall, correctly classifying 75.5% of cases, with a Nagelkerke R^2 of 0.414, indicating that approximately 41.4% of the variance in insurance ownership was explained by the model. Notably, financial literacy score emerged as the only statistically significant predictor of insurance ownership ($B = 1.642$, $p < .001$, OR= 5.165), suggesting that individuals with higher financial literacy were over five times more likely to own insurance, controlling for all other factors.

This finding reinforces a growing body of literature highlighting the pivotal role of financial literacy in shaping financial behaviors. Lusardi and Mitchell (2014) argued that financial literacy directly influences risk assessment, product comparison, and long-term planning—competencies crucial for insurance participation. In the Philippine context, where insurance penetration remains below 50% despite increased financial access (Bangko Sentral ng Pilipinas [BSP], 2021), these results suggest that knowledge—more than demographics—is the enabling factor in insurance decision-making.

Interestingly, none of the demographic variables—including socioeconomic class, education, employment status, gender, and age group—were statistically significant predictors in this

model ($p > .05$). While prior studies have shown that individuals with higher education and income levels are more likely to be insured (OECD, 2020; Eling, Pradhan, & Schmit, 2021), the lack of significance here suggests that financial literacy may mediate or overshadow these demographic influences. This is consistent with findings by Choung, Kim, and Park (2023), who demonstrated that digital financial skills and confidence, rather than income or gender, were stronger predictors of financial product uptake—including insurance—in South Korea.

The non-significant role of educational attainment is particularly noteworthy. While education is often correlated with better financial decisions, it may not guarantee functional financial competence. The distinction between general education and financial literacy has been emphasized in empirical studies (Lusardi, 2019), where even college-educated individuals exhibited poor understanding of compound interest, risk diversification, or insurance premiums.

Similarly, socioeconomic class and employment status—typically considered enablers of access—did not significantly predict insurance ownership in this model. This suggests that possession of financial resources does not automatically translate into protective financial behavior. As Eling et al. (2021) noted, insurance decisions often depend on perceived need and cognitive ability to evaluate risk, rather than income level alone.

These results point to a paradigm shift in understanding insurance behavior. Rather than being driven purely by demographics, insurance ownership appears to be primarily a knowledge-driven behavior. This emphasizes the urgent need for targeted financial education interventions, particularly those focusing on insurance literacy, risk perception, and product comparison. Therefore, national efforts to enhance

financial inclusion must go beyond access and include capability-building programs that empower individuals to make informed financial choices. While financial literacy was the only statistically significant predictor, the directionality of coefficients for non-significant variables may still hold theoretical value. For instance, employment status and education showed positive but non-significant associations, suggesting potential moderating effects not captured in this model. Future studies could explore interaction effects, such as whether financial literacy interacts with education or gender in predicting insurance uptake. To visually illustrate the strength of prediction, a probability plot (Figure X) can be presented, showing the increasing likelihood of insurance ownership across financial literacy scores.

Conclusion and Recommendations

The findings of this study underscore the pivotal role of financial literacy in influencing insurance ownership among Filipino adults. Of all the variables analyzed, only financial literacy emerged as a statistically significant predictor. Respondents with higher financial literacy scores were found to be over five times more likely to own insurance compared to their less literate counterparts, even after controlling for demographic factors such as age, gender, employment status, educational attainment, and socioeconomic class. This result aligns with existing literature suggesting that financial capability—particularly the ability to assess risks and understand financial products—is more influential than demographic characteristics in shaping financial behavior.

It is noteworthy that traditional enablers such as income, education, and employment status did not significantly predict insurance uptake. This may reflect the distinction between general education and functional financial literacy, as formal schooling does not necessarily equip individuals with the skills required for informed financial decision-making. The absence of a significant association between

socioeconomic class and insurance ownership further supports the argument that access to financial resources alone does not guarantee financial protection behaviors.

A key limitation of this study, however, is the use of simulated data. Due to restricted access to individual-level microdata from the Bangko Sentral ng Pilipinas (BSP) Financial Inclusion Survey 2021, the analysis relied on a dataset constructed to reflect national-level proportions and distributions. While the simulation was designed to closely replicate real-world demographic patterns, the findings should be interpreted with caution, recognizing that simulated data cannot fully capture the nuances of actual individual behavior.

Based on the results, it is recommended that national financial inclusion efforts go beyond expanding access and focus more heavily on strengthening financial capability. Targeted financial education programs—particularly those emphasizing insurance literacy, risk awareness, and product comparison—should be integrated into both formal education systems and community-based initiatives. Enhancing financial literacy at the population level may serve as a more effective strategy for increasing insurance participation and promoting long-term financial resilience among Filipino households. A limitation of this study is its reliance on simulated data rather than actual BSP microdata, which restricts external validity. Additionally, the absence of longitudinal data prevents analysis of behavioral change over time, and the lack of interaction testing may overlook nuanced relationships. Future research should validate these findings with actual datasets, incorporate longitudinal designs, and test mediating or moderating factors such as financial self-efficacy. Practically, interventions should be more targeted: integrating insurance literacy into the senior high school curriculum, embedding financial education in employer-led wellness programs, and leveraging digital platforms for microlearning modules.

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