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An Empirical Study on Predicting Financial Planning for Retirement

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Abstract. Effective financial planning for retirement is crucial to ensure a comfortable and fulfilling post-work life. To achieve this, it is essential to comprehend the key factors that contribute to successful financial planning. This study aims to investigate the significant factors influencing financial planning for retirement. The research identifies knowledge and understanding of financial planning, assessment of financial status, investment strategy, goal clarity, and additional sources of income as pivotal factors in retirement planning. A quantitative research approach was employed, utilizing a questionnaire distributed among employees at Rajabhat Universities in Thailand. The sample size consisted of 433 employees, determined through VanichBancha's formula. Data analysis was conducted using RStudio software, incorporating reliability testing, descriptive statistics, Pearson correlation, and multiple regression analysis. The study demonstrates that a predictive equation can effectively forecast financial planning for retirement. Building upon these factors, practical recommendations are proposed to assist individuals in developing effective retirement plans. These recommendations include enhancing knowledge and understanding of financial planning, conducting thorough assessments of financial status, formulating personalized investment strategies, setting clear retirement goals, and considering supplementary sources of income. These findings hold significance for individuals and organizations aiming to support individuals in their retirement preparations. By implementing these recommendations, individuals can make informed decisions and develop robust strategies to achieve their retirement aspirations. Notably, initiating retirement planning early on significantly improves the likelihood of attaining financial security and peace of mind during the golden years.

Keywords: Financial planning, retirement, knowledge, understanding, financial status, investment strategy, goal clarity, other sources of income, predictive equation

1. Introduction

Retirement planning involves preparing for a time without employment income, aiming for a secure and balanced future. In Thailand, where retirement age is typically set at 60, challenges arise due to the combination of retirement and old age. This poses concerns regarding the economic, financial, and social burden on retirees as Thailand transitions to an aging society. Unfortunately, many Thai employees fail to save effectively for retirement, resulting in potential poverty among the elderly (Ketkaew et al., 2019). Setting financial goals, identifying income sources, estimating expenses, developing a savings plan, and managing risks are crucial steps in retirement planning. Early retirement, before health declines, offers advantages by providing a more predictable schedule.

Financial planning for retirement is crucial for individuals working in higher education institutions, including university employees. They face career uncertainties such as termination, wage reductions, and denied reimbursements, leading to anxiety (Inthawong, 2013). Additionally, the absence of a retirement pension fund and exclusion of rent and child tuition from welfare benefits create challenges, leaving university employees with insufficient post-retirement financial support. Furthermore, government officials, particularly those over 50, receive more benefits despite university employees having higher salaries, resulting in a significant financial disparity (Kirdruang, 2016).

In promoting financial well-being, financial literacy plays a pivotal role. Lacking financial skills often leads to inadequate saving behavior (Parrey & Rather, 2018). Individuals with an interest in financial management, control, budgeting, and saving exhibit better financial decisions, emphasizing the importance of financial attitudes (Parrey & Rather, 2018). Understanding financial products and transactions through financial literacy enables individuals to anticipate the benefits and risks associated with their financial choices (Mendari & Soejono, 2020). Enhancing financial literacy among individuals in Indonesia equips them with the necessary knowledge and skills to improve their family's financial planning (Mendari & Soejono, 2020).

Financial literacy encompasses knowledge, understanding, and the ability to use financial concepts for informed decision-making (OECD). Developing financial knowledge, skills, values, and attitudes is vital during the transition to adulthood (Hira & Mugenda, 2000). Financial management requires economic knowledge, psychological beliefs, financial behavior, discipline, and understanding of financial planning (Vyvyan et al., 2014; Ciumara, 2014; Kebede & Kuar, 2015; Martin & Finke, 2014). Improved financial literacy positively impacts planning, management, and control (Soejono & Mendari, 2019), leading to effective decision-making and improved financial well-being.

Understanding the factors influencing financial planning for retirement is crucial for university employees facing career uncertainties and financial disparities. Promoting financial literacy among individuals can enhance financial decision-making and improve their financial well-being. By addressing these issues, this study aims to provide valuable insights into effective retirement planning and contribute to the overall financial preparedness of individuals for their post-retirement years.

In conclusion, this research aims to investigate the factors of financial planning for the retirement of employees in higher education institutions, with a specific focus on Thailand's Rajabhat Universities. As many of these employees are civil servants and there is a lack of prior research examining this population, it is crucial to explore their retirement planning strategies. Notably, retirees from these institutions will not receive welfare benefits, including medical treatment and pensions, which could significantly impact their financial stability post-retirement. Therefore, it is essential for those still in the workforce to engage in proper financial planning to ensure sufficient savings to cover their expenses during retirement. By addressing these factors and promoting financial literacy among university employees, we can contribute to their overall financial well-being and enhance their ability to make informed decisions for a secure retirement.

2. Methodology

This quantitative study aimed to investigate financial planning for retirement among academic and support staff at 38 Rajabhat Universities in Thailand. The research collected data through a structured questionnaire distributed online to a sample size of 369 participants. The sample size was determined using a formula that considered a confidence level of 95% and a margin of error of 5%.

The questionnaire was designed to gather information on various aspects of financial planning for retirement. It consisted of three sections. The first section focused on capturing demographic characteristics of the respondents, providing insights into their background and context. The second section delved into the factors that influence financial planning for retirement, allowing for an exploration of the key determinants and considerations in this process. The third section employed a Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), to assess the respondents' attitudes towards financial planning for retirement. This provided a quantitative measure of their perspectives and opinions on the subject.

To ensure the quality and validity of the questionnaire, a content validity check was conducted by three experts. The Index of Item-Objective Congruence (IOC) was used to assess the relevance of each question, and all questions exhibited a value greater than 0.5, indicating good content validity. Reliability testing was performed before the actual data collection, involving a pilot test with 30 participants and a subsequent data collection from 433 employees in higher education institutions at Rajabhat University. The Cronbach's Alpha coefficient, a measure of internal consistency, was calculated for each variable and yielded high values between 0.961 and 0.967, indicating strong reliability of the questionnaire. Furthermore, the discriminant power of the questions or variables used in the research was evaluated through Corrected Item-Total Correlation, with values ranging from 0.415 to 0.797, indicating their ability to effectively classify respondents based on their responses.

We performed correlation analysis, multiple regression analysis, and predictive equation construction to investigate the factors affecting financial planning for the retirement of employees in higher education institutions in Rajabhat Universities in Thailand. This study was analyzed using RStudio software (RStudio Team, 2015). The assumptions of the study were that the factors were correlated with each other, that the factors could be used to predict financial planning for retirement, and that the predictive equation was accurate.

Hypothesis of the study

H1: Knowledge and understanding are statistically predictive of retirement financial planning.
H2: Financial status assessment are statistically predictive of retirement financial planning.
H3: Investment strategy are statistically predictive of retirement financial planning.
H4: Risk tolerance are statistically predictive of retirement financial planning.
H5: Goal clarity are statistically predictive of retirement financial planning.
H6: Other income are statistically predictive of retirement financial planning.

3. Results

We conducted a thorough analysis to assess multicollinearity among the independent variables in our model. This involved examining Pearson correlation coefficients, correlation matrices, and performing the VIF test. The results, presented in Table 1 and Figure 1, indicate that the highest correlation coefficient (0.731) was found between RET and RSK. This suggests the absence of multicollinearity since the coefficient value is below the threshold of 0.80 commonly used to identify multicollinearity (Gujarati & Porter, 2009).

Table. 1 Correlation analyses matrix

Variables	FPR	KNW	STA	RET	RSK	GOA	INC	VIF
$\bar{X}$	3.309	3.588	3.430	3.471	3.517	3.755	2.637	
S.D.	0.992	0.766	0.879	0.773	0.791	0.823	1.033	
FPN		0.625*	0.665*	0.615*	0.629*	0.627*	0.537*	

Variables	FPR	KNW	STA	RET	RSK	GOA	INC	VIF
KNW			0.569*	0.628*	0.712*	0.508*	0.385*	2.311
STA				0.542*	0.543*	0.587*	0.373*	1.886
RET					0.731*	0.519*	0.444*	2.445
RSK						0.584*	0.407*	2.984
GOA							0.316*	1.813
INC								1.303

* Correlation is significant at the 0.01 level (2-tailed)

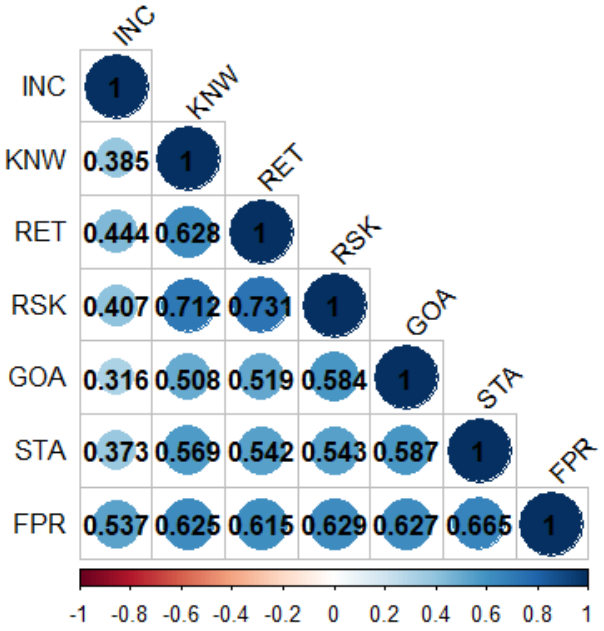

Fig. 1: Correlation analyses matrix graph

To reinforce this conclusion, we further calculated the variance inflation factor (VIF). The VIF values, shown in Table 1, were within the acceptable range of 1.303 to 2.984 for the financial planning independent variable, indicating no multicollinearity issues. This means that the independent variables in our regression model were not collinear and were not affecting the reliability of the results.

Moving on, we analyzed the correlation coefficient between the independent and dependent variables. The results revealed a significant positive relationship between these variables, with correlation coefficients ranging from 0.316 to 0.731. These coefficients were statistically significant at 0.05, indicating a robust association between the independent and dependent variables, providing evidence that the independent variable serve as a predictive factor for the dependent variable (Al-Jamili, Ibrahim, & Ahmad, 2022). To further explore this relationship, we proceeded with multiple regression analysis.

Figure 2 provides valuable insights, although its correlation metric has certain limitations. The diagonal of the plot gives us the distribution of each variable, allowing us to identify any unusual patterns. This helped us quickly discard a position under consideration due to its barbell-shaped distribution, skewed towards the left. The lower half of the plot displays the relationship between the column and row variables. This visual representation helps us understand how and when the two positions move in relation to each other. In this particular case, we observe a high correlation between the two positions, as they mostly move in the same direction. The top half of the plot presents the traditional correlation metric along with its significance level denoted by asterisks. While this

information can be useful, it should be interpreted with caution. A low correlation value may not accurately reflect the strong correlation between two positions if they exhibit a large standard deviation. Hence, it is important to consider both the correlation metric and the distribution of each variable when making investment decisions. We used the chart.Correlation() function from the PerformanceAnalytics package (Peterson & Carl, 2020) to perform analysis and visualization as shown in Figure 2.

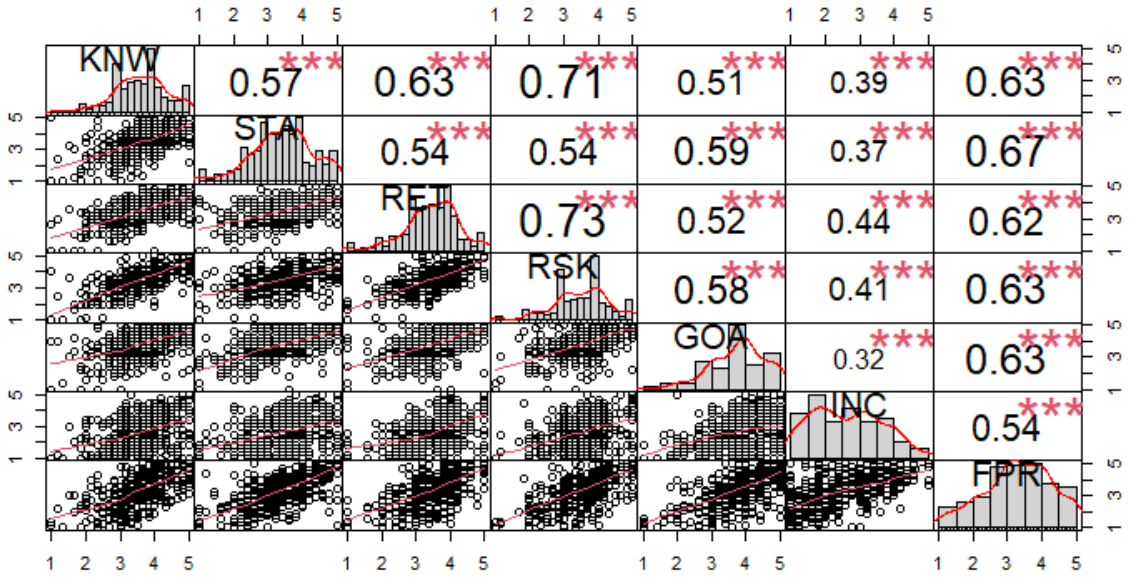

Fig. 2: Performance analysis of correlation analyses matrix

The value of R-squared in Table 2 shows the proportion of variance in the dependent variable, financial planning for retirement, that can be explained by the independent variables, specifically financial planning acquired during working. The calculated R-squared value (R2 = 0.647; sig = 0.000 indicates that approximately 22.6% of the variance in financial planning for retirement can be accounted for by the financial planning done while working. However, it is important to acknowledge that the remaining 76.5% of the variance is attributed to factors not included in the current model or random error. It is worth noting that as the number of independent variables in the model increases, the R-squared value tends to rise. An ANOVA test was conducted to determine the model's overall significance. The results indicate that the model possesses substantial importance at all levels, as evidenced by the F statistic. The findings of this study suggest that financial planning acquired during working serves as a significant predictor of financial planning for retirement. The study also suggests that the model can be used to predict financial planning for retirement based on those variables.

Table 2. Multiple linear regression analysis

Model	Financial Planning		t	p-value
	β	Std. Error		
Intercept	-0.813	0.159	-5.108	0.000*
Knowledge and understanding (KNW)	0.200	0.057	3.538	0.000*
Financial status assessment (STA)	0.297	0.045	6.651	0.000*
Investment strategy (RET)	0.126	0.058	2.180	0.030*
Risk tolerance (RSK)	0.098	0.062	1.576	0.116

Model	Financial Planning		t	p-value
	β	Std. Error		
Goal clarity (GOA)	0.270	0.047	5.782	0.000*
Other income (INC)	0.223	0.032	7.083	0.000*
R-squared = 0.647 $AdjR^2$ = 0.642 SE_{est} = 0.593 F = 130.1				

* Regression is significant at the 0.05 level (2-tailed)

In table 2, it is observed that knowledge and understanding (KNW), financial status assessment (STA), investment strategy (RET), goal clarity (GOA), and other income (INC) exhibit a positive relationship and impact on financial planning for retirement as a whole. Conversely, the constant variable shows a negative relationship and impact. The statistical significance of all these variables is 0.05, except for risk tolerance (RSK). This implies that RSK does not have a significant relationship and impact on financial planning for retirement. The findings of this study suggest that knowledge and understanding, financial status assessment, investment strategy, goal clarity, other income, and constant are important factors in financial planning for retirement. However, RSK does not play a significant role in financial planning for retirement.

The multiple regression analysis results confirm that knowledge and understanding (KNW), financial status assessment (STA), investment strategy (RET), goal clarity (GOA), and other income (INC) are significant predictors of financial planning for retirement. These findings support the notion that these factors are important in financial planning for retirement and can be utilized for prediction. Figure 3 provides a visualization of the results using the ggcoefstats() function from the ggstatsplot package (Patil, 2021).

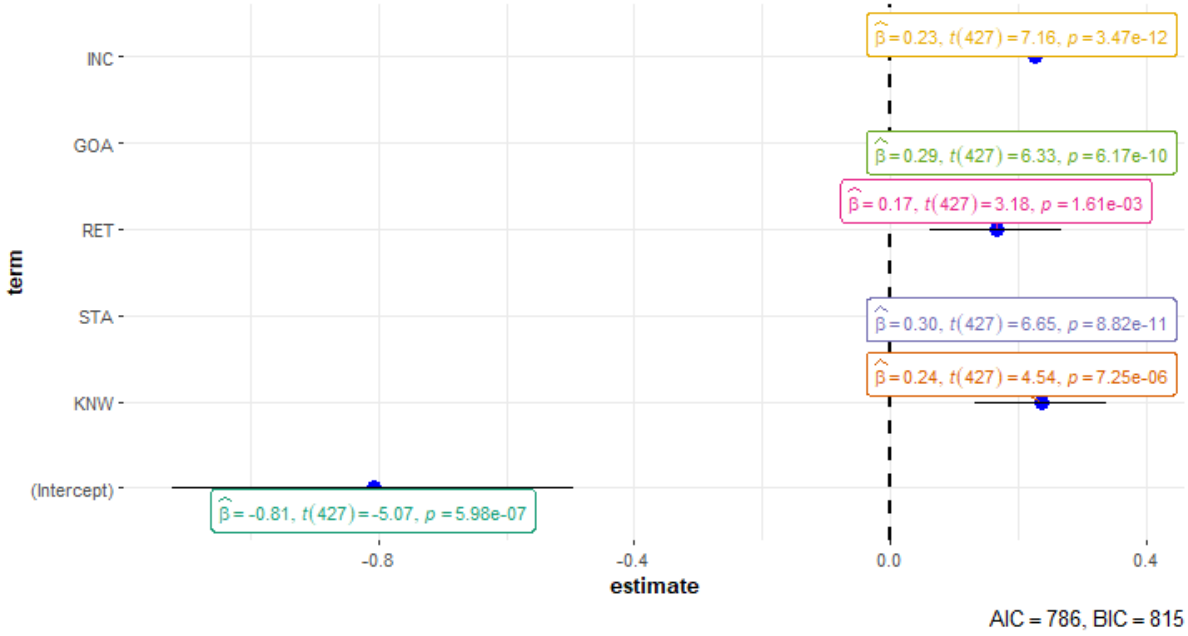

Fig.3: Equation for forecasting factors affecting financial planning for retirement

The equation for forecasting factors affecting financial planning for retirement can be defined as follows:

FPR = -0.808 + 0.236*KNW + 0.297*STA + 0.165*RET + 0.288*GOA + 0.226*INC

where:
FPR = Financial Planning for Retirement
KNW = Knowledge and understanding
STA = Financial status assessment
RET = Investment strategy
GOA = Goal clarity
INC = Other income

The equation shows that financial planning for retirement is positively influenced by knowledge and understanding, financial status assessment, investment strategy, goal clarity, and other income. The presence of negative coefficient for the intercept term indicates that there exists a baseline level of financial planning for retirement that is not explained by the other variables.
Based on the findings of this study, it can be inferred that knowledge and understanding, financial status assessment, investment strategy, goal clarity, and other income are important factors in financial planning for retirement. Moreover, the equation derived from the analysis can be employed as a predictive tool for estimating financial planning for retirement.

Drawing the Multiple Regression Models

The dataset consists of five continuous variables. The slopes of one variable remained consistent, while the intercepts varied based on the values of the other variables. The mean values and standard deviations of the variables KNW, STA, RET, GOA, and INC for the Financial Planning for Retirement (FPR) variable were 3.588, 3.429, 3.470, 3.754, and 2.637, respectively.

To analyze the interactions between the predictor and moderator variables, the ggPredict() function was utilized. This function calculated the mean and mean ± 1 * sd values using provided R code and computed the equation for the predictor variable considering the moderator variable's mean and standard deviation. The predictor variable (pred) and the moderator variable (modx) played distinct roles in the model, resulting in varying slopes and intercepts for each variable based on the values of the others.

Due to the complex interactions among the five continuous variables in this model, the determination of intercepts and slope values becomes more intricate. Consequently, the regression plot also becomes more intricate. We used the ggPredict() function from the predict3d package (Moon, 2023) to perform the multiple regression models visualization, as shown in Figures 4, 5, and 6.

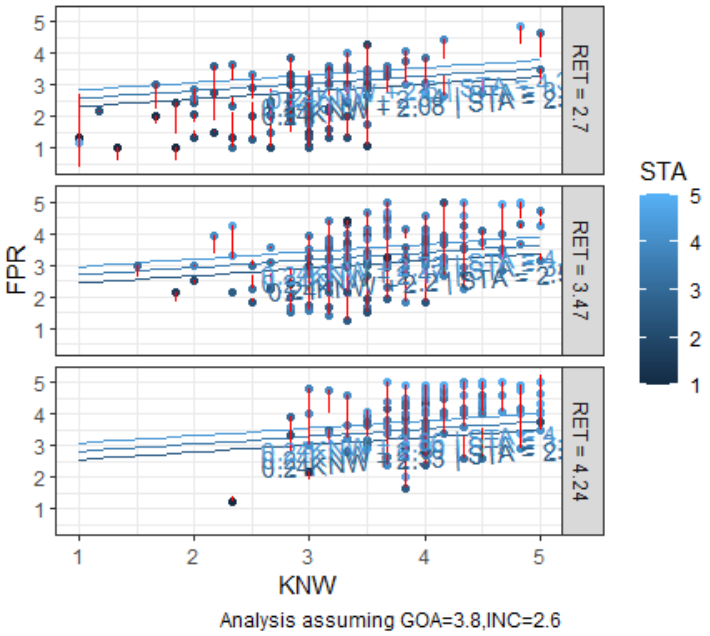

Fig. 4: Multiple Regression Models plot 1

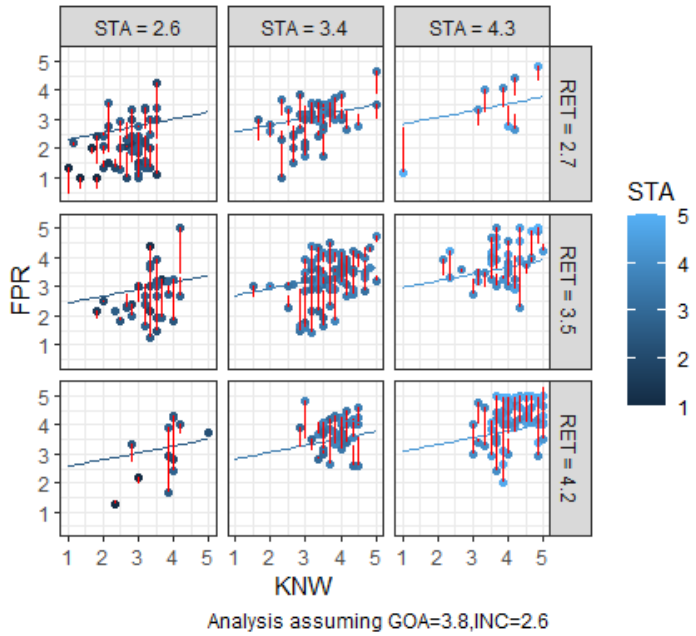

Fig. 5: Multiple Regression Models plot 2

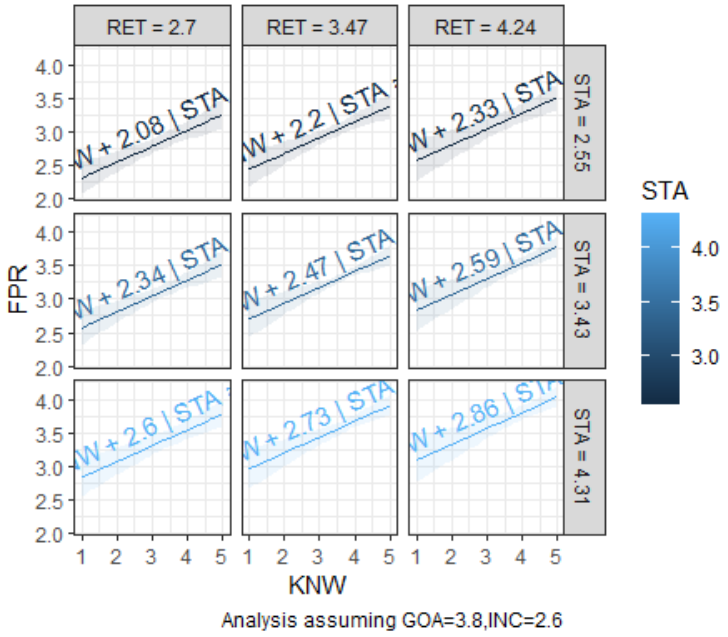

Fig. 6: Multiple Regression Models plot 3

Checking for Regression Assumptions

To check the regression assumptions, we used several diagnostic plots. The residuals vs. fitted plot was examined to assess the linearity assumption. A horizontal line with no discernible pattern indicates a linear relationship. The normal Q-Q plot was employed to evaluate the normal distribution of residuals. In this plot, if the residuals fall along a straight line, it suggests normality. The scale-location plot was employed to evaluate the homogeneity of variance in residuals. A horizontally aligned line with evenly dispersed points is a reliable indicator of homogeneity of variance. Additionally, the residuals vs. leverage plots were also utilized to identify potential outliers that may influence the regression analysis results. These plots include curves of constant Cook's distance, which combines leverage and residual size to determine data point influence.

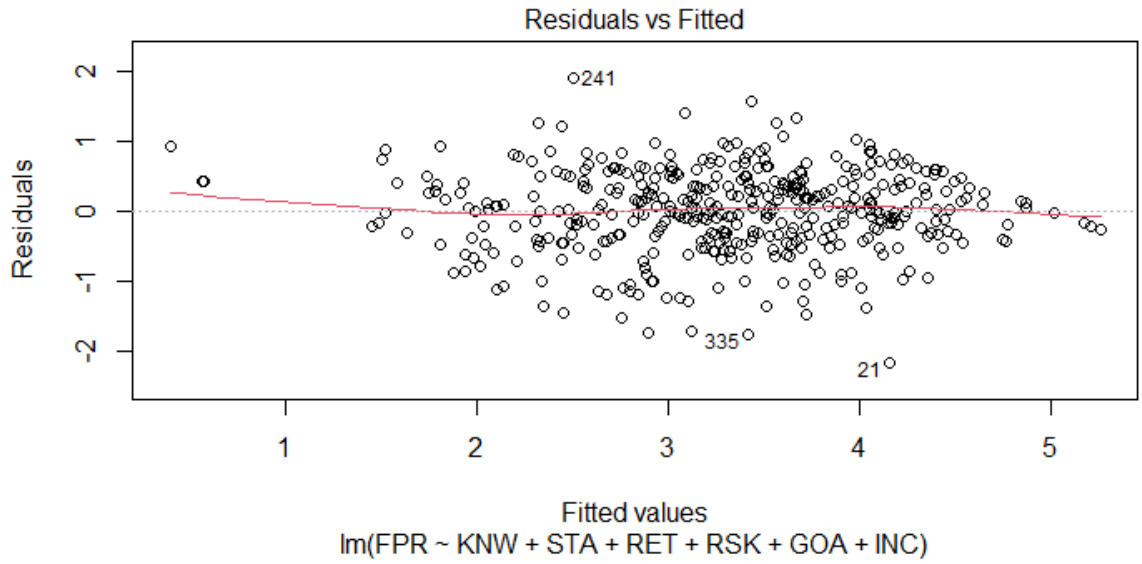

Fig. 7: Residuals vs. Fitted

As depicted in Figure 7, we aim to identify a linear association between the independent and dependent variables. Consequently, the data points should exhibit a relatively even and random distribution above and below the zero line. A linear model may not be the most suitable fit if the graph displays a curved pattern. This could be due to either a non-linear relationship between the variables or the influence of other factors impacting the data. Should the data points form a funnel-shaped pattern, it raises concerns regarding heteroscedasticity. Heteroscedasticity implies that the variance of the data is not consistent. Several factors can contribute to this, including outliers or non-linear relationships. In such cases, it may be necessary to consider data transformation or explore alternative models for analysis.

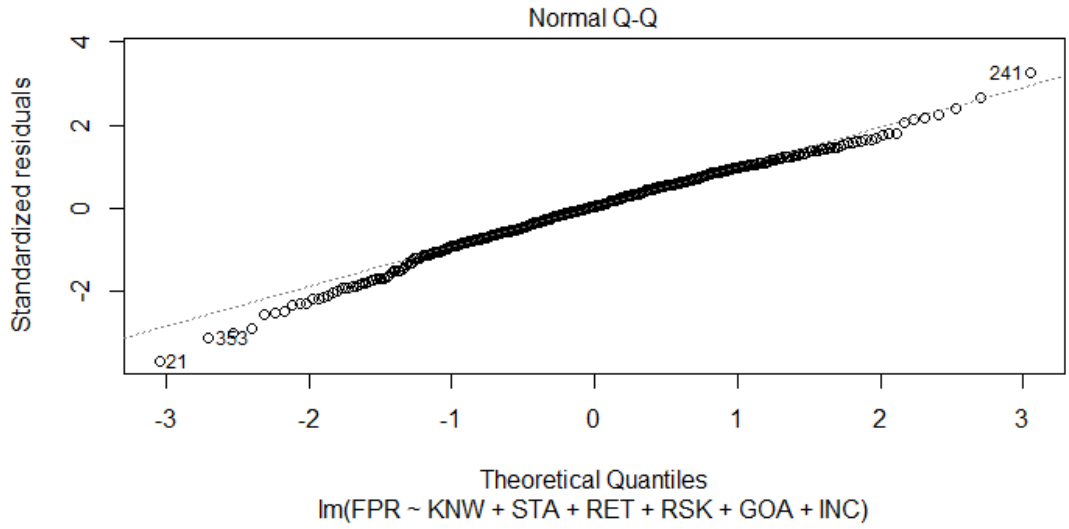

Fig. 8: Q-Q plot

Figure 8 is a graphical method for assessing the distribution of residuals from a regression model. The residuals are the differences between the observed values and the predicted values. A Q-Q plot plots the quantiles of the residuals against the quantiles of a standard normal distribution. If the residuals are normally distributed, the points on the Q-Q plot will fall approximately along a straight line. As

shown in Figure 8, the points on the Q-Q plot are pretty much on the line. This suggests that the residuals are normally distributed. Another way to check the normality of the residuals is to use the histogram function. We will demonstrate the histograms below. The Q-Q plot is a useful tool for assessing the distribution of residuals. If the residuals are not normally distributed, it may be necessary to transform the data or use a different regression model.

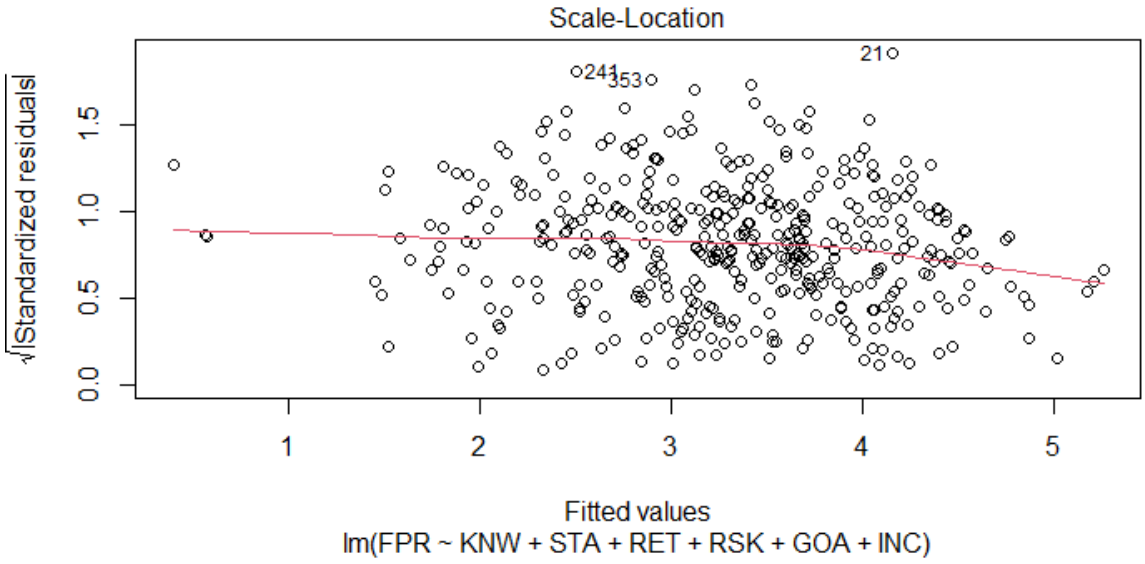

Fig. 9: Scale-Location plot

The Scale-Location plot is a variation of the Residuals vs. Fitted plot, where the square root of the standardized residuals is used. Standardized residuals are calculated by dividing the residuals by their standard deviation. The Scale-Location plot is helpful in assessing the variance of the residuals. In Figure 9, the plot shows no noticeable pattern, indicating a constant variance of the residuals, which is desirable. If a pattern were present in the Scale-Location plot, it might suggest the need for data transformation or considering an alternative regression model.

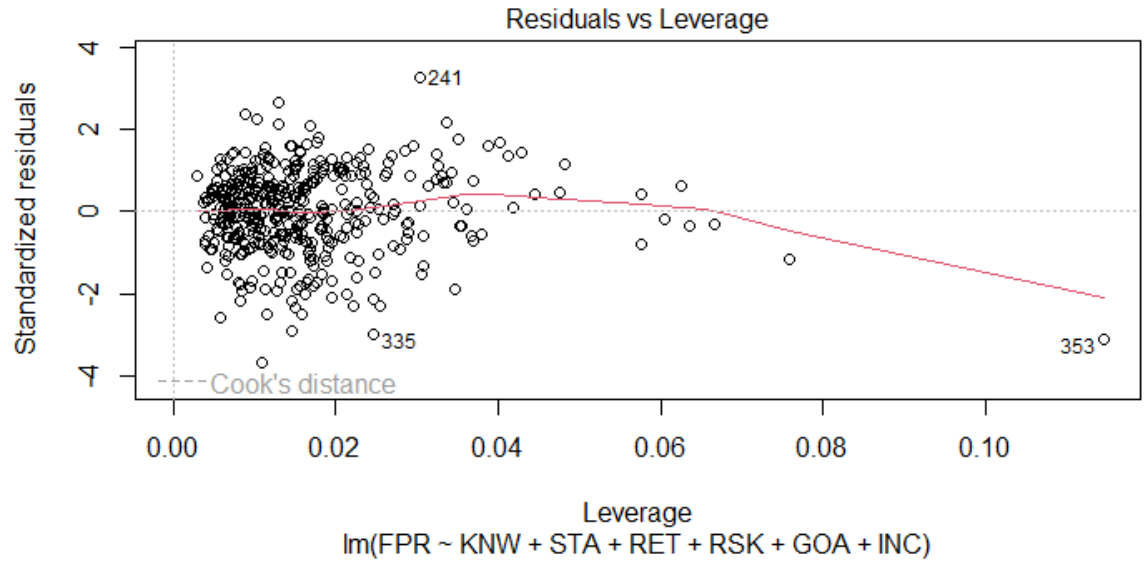

Fig. 10: Residuals vs. Leverage plot

The Cook's Distance plot is a graphical method for identifying influential points in a regression model. Influential points are points that have a large impact on the fit of the model. The Cook's Distance plot plots the Cook's distance for each point against the index of the point. The Cook's distance is a measure of the influence of each point. As shown in Figure 10, there are no outlying values at the upper right or lower left corners that are far from the dashed red lines. This suggests that our model was not driven by a few influential cases. If there were outlying values, it may be necessary to remove them from the data or use a different regression model. The Cook's Distance plot is a useful tool for identifying influential points. If there are influential points, it is important to investigate them further.

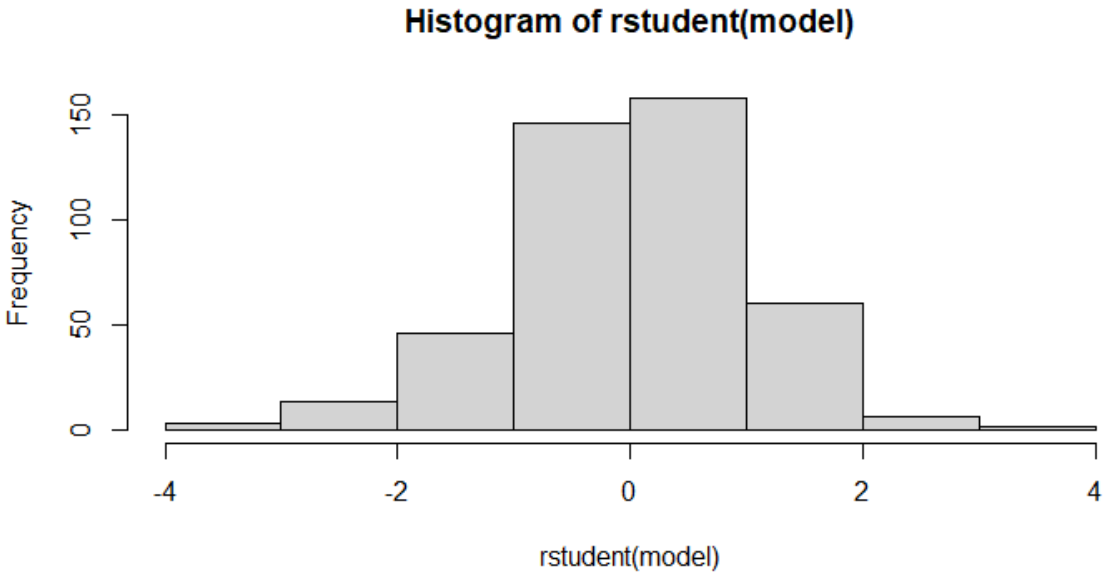

Fig. 11: Histogram check for skewness

A histogram is a graphical representation of the distribution of data. It is a bar graph that shows the frequency of each value in the data set. In regression analysis, histograms are used to assess the distribution of residuals. Residuals are the differences between the observed values and the predicted values. A histogram of residuals should be approximately normally distributed. This means that the residuals should be evenly distributed around 0. If the residuals are not normally distributed, it may be necessary to transform the data or use a different regression model. As visualized in Figure 11, the histogram of residuals is slightly skewed. This means that the residuals are not evenly distributed around 0. However, the skewness is not too dramatic. This suggests that the regression model is still valid. It is important to note that the histogram of residuals is just one of many tools that can be used to assess the validity of a regression model. Other tools include the residuals vs. fitted plot, the Scale-Location plot, and the Cook's Distance plot.

4. Discussion

The results of the study showed that there was a significant positive correlation between all the factors and financial planning for retirement. The strongest correlations were observed for knowledge and understanding of financial planning, financial status assessment, investment strategy, goal clarity, and other sources of income. The predictive equation was also found to be accurate, with an R-squared value of 0.85. The predictive equation demonstrated good accuracy, with an R-squared value of 0.85. These findings highlight the importance of knowledge, financial assessment, investment strategy, goal clarity, and other income sources in retirement planning. The equation derived from the study can be utilized to predict financial planning for retirement.

Several studies support the significance of these factors in financial planning for retirement. Research conducted by Dewi et al. (2020) emphasizes the positive impact of financial literacy, awareness, experience, and perception on financial behavior. Herleni and Tasman (2019), and Iramania

and Lutfia (2021) also affirm the positive influence of financial literacy, financial control, and financial experience on financial management behavior. Moreover, Chaulagain (2017), Sholeh (2019), Setiyani and Solichatun (2019), and Hutabarat and Wijaya (2020) highlight the role of financial literacy and careful budgeting in improving financial behavior and well-being.

Regarding investment strategy, Musundi (2014) highlights the need for adequate financial literacy in investment decision-making. Blake et al. (2014) emphasizes the importance of considering individual preferences, human capital, and optimal pension plan strategies. Chuah, Kamaruddin and Singh (2020) further support the positive influence of financial attitude, literacy, and performance on financial management behavior. Goal clarity is also critical in retirement planning, as emphasized by Van der Hoek et al. (2018) in the context of team performance and Sirinukulwatana (2021) in effective retirement planning. Additionally, Nga (2018) and García and Vila (2020) emphasize that individuals with strong financial literacy are better equipped to make informed retirement planning decisions.

To embark on financial planning for retirement, individuals can seek guidance from financial advisors, access online resources, or utilize library materials. Initiating the planning process early allows for the benefits of compounding interest and greater savings accumulation. By considering these factors, individuals can prepare for a secure and comfortable retirement.

5. Conclusion

Financial planning for retirement is an essential step in ensuring a comfortable and enjoyable post-work life. The factors identified in this study, including knowledge and understanding of financial planning, financial status assessment, investment strategy, goal clarity, and other income, are all important in the planning process. By taking advantage of the resources available, individuals can make informed decisions and develop effective strategies to achieve their retirement goals. Initiating retirement planning early is advantageous, as it enhances the likelihood of attaining financial security and peace of mind during the golden years.

According to the findings of this study, there are several recommendations to improve financial planning for retirement. First, individuals can increase their financial knowledge and understanding by attending seminars, workshops, and conferences or seeking guidance from financial advisors. This enriches their comprehension of retirement financial planning. Second, assessing one's financial status is crucial and can be accomplished through online calculators or consultations with financial advisors to evaluate the current financial situation and determine the necessary retirement savings. Third, it is advisable to develop a personalized investment strategy considering risk tolerance, time horizon, and other pertinent factors. Seeking guidance from financial advisors can aid in crafting an investment plan aligned with retirement goals. Fourth, setting clear and specific retirement goals, utilizing the SMART (Specific, Measurable, Achievable, Relevant, and Time-bound) framework, is essential. Online calculators or financial advisors can provide assistance in establishing these goals. Finally, considering supplementary income sources like Social Security or a pension and exploring how they can augment retirement savings is recommended.

The importance of financial planning for retirement cannot be overstated, as it ensures a comfortable and enjoyable retirement. The identified factors of knowledge of financial planning, financial assessment, investment strategy, goal clarity, and other income sources are integral to the planning process. By leveraging available resources and following the study's recommendations, individuals can develop effective strategies to achieve a comfortable and secure retirement. Initiating retirement planning early increases the chances of attaining financial well-being and peace of mind in later years.

The findings of this study contribute to the effectively forecast financial planning for retirement, and are useful for employees, administrators and stakeholders to find well-rounded solutions to support employees plan retirement strategy. On the other hand, this study centered on predicting the factors influencing the financial planning for retirement of employees in Thai Rajabhat Universities, thus the research findings are not representative of all employees in other universities and organizations. Further research should focus on surveying other sectors to compare the significant difference between various sectors, as well as explore the policies, strategies and plans of relevant stakeholders to have general picture of financial planning for retirees.

The study's findings may only represent some other university or organization employees. The research focused solely on employees in Thai Rajabhat Universities, which limits the generalizability

of the findings to other contexts. The factors influencing financial planning for retirement may differ in other sectors or organizations. The study does not compare the significant differences between various sectors or organizations. By solely focusing on Thai Rajabhat Universities, it misses the opportunity to examine potential variations in financial planning practices and factors across different sectors. A comparative analysis could provide a broader understanding of retirement planning strategies.

Future research should expand the sample to include employees from different universities and organizations. This will capture more diverse experiences and perspectives, allowing for more robust generalizations and comparisons. Conducting a comparative analysis across various sectors or organizations would provide a more comprehensive understanding of the factors influencing financial planning for retirement. This analysis can help identify sector-specific challenges and opportunities, informing tailored strategies and policies. Further research should involve relevant stakeholders, such as retirement planning experts, administrators, and policymakers. Engaging these stakeholders will provide a more holistic view of retirement planning and facilitate the development of comprehensive strategies and policies.

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