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FINANCIAL LITERACY | RESEARCH ARTICLE

Financial and Pension Literacy and Retirement Preparedness in Sri Lanka: Evidence from Employee Provident Fund Contributors

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Abstract: Sri Lanka has a rapidly aging population in South Asia, but little attention is given to financial preparedness for retirement. This study expects to provide an overview of the current retirement system in Sri Lanka and investigate financial and pension literacy's role in retirement preparedness. This study administered an online survey to study retirement preparedness subjectively (n = 142) and objectively (n = 115) among the EPF contributors. This non-experimental study uses an online survey to assess financial and pension literacy's roles in retirement preparedness. This study used ordered logistic (Ologit) regressions and ordinary least squares (OLS) regressions to test the two hypotheses. Results indicate a positive and statistically significant association between financial (only objective measure) and pension literacy and retirement preparedness. However, another study shows no synergy effect between financial and pension literacy. Conclusively, drawing policymakers' attention to diversifying EPF investments, including financial and pension literacy concepts in workplace workshops and studying pension literacy and retirement preparedness in different samples.

Keywords: employee provident fund, pension literacy, retirement preparedness, Sri Lanka financial literacy

JEL Classification: D11, D14, J10, J14

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PUBLIC INTEREST STATEMENT

Retirement preparedness is a less-studied topic among Sri Lankans and Asians in General. But, as Sri Lankan population ages and values change, old age poverty may lead to a crisis if individuals do not plan for their life after retirement.

This research draws attention to the importance of financial and pension literacy to enhance retirement preparedness at an individual level and impacting retirement related policies, specifically for Sri Lanka and Asia.

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1. Introduction

Sri Lanka has the fastest aging population in South Asia. Its population over 60 years is expected to grow from 15 percent in 2015 to 25 percent by 2050 (Tilakaratna et al., 2019). Similarly, the population over 65 years in the countries that belong to Organization for Economic Co-operation and Development (OECD) is expected to increase to 27 percent in 2050 from 17 percent in 2017 OECD (2019). Although Sri Lanka's aging population growth mirrors that of the growth experienced in the OECD countries, it is higher than its South Asian counterparts such as India (10% in 2019 to 20% in 2050), Bangladesh (8% in 2019 to 22% in 2050), and Pakistan (7% in 2019 to 12% in 2050) (HelpAge International, 2021). The OECD countries have the financial capabilities to embrace the aging population through government-sponsored social welfare services, tax-sheltered retirement saving systems, and well-regulated private pension markets. Nevertheless, due to the existing debt burden, the Sri Lankan government cannot provide social welfare programs, nor is the government able to provide tax-sheltered retirement saving options.

Moreover, the patriarchal culture in Sri Lanka, like in many Asian countries, entrusts a high responsibility to the family system to care for the retiree (Van Katwyk, 2012). United Nations (2017) report finds that more than half of older persons living with their children in 93 percent of Asian countries compared to only 20 percent of the US individuals living with children. However, family structure has changed in Asia, with adult children moving to urban areas or other countries for better prospects (Chomik & Piggott, 2013; Yeung & Thang, 2018). Samath (2019) reports a similar case in Sri Lanka, where there has been an increase in assisted living facilities over the past decade, implying a decrease in the elderly living with their adult children. Given the fast aging population, changes in family values, and the inability of the government to provide an inadequate social safety net, developing nations such as Sri Lanka must encourage individuals to take ownership of their retirement (Chomik & Piggott, 2015).

Sri Lanka's government has established different programs to encourage retirement savings depending on the employer type. Those employed in the public sector benefit from a defined benefit plan (DB Plan), informal sector employees can contribute to a voluntary defined contribution plan (DC plan), and the Employee Provident Fund (EPF) for the private sector employees (Karunarathne, 2003). The private sector has several important characteristics. The private sector employs nearly half of the labor force, the largest employer in Sri Lanka; this segment neither provides options in the retirement saving plans like the informal sector nor a defined benefit plan like the public sector employees.

The EPF operates with employees contributing 8 percent after-tax and employers matching the contribution with 12 percent (alternatively, this could be 10% by the employee and 15% by the employer, whichever the company policy is). Notably, the EPF is the largest single-managed fund in Sri Lanka, managed by the Central bank, which is also entrusted with managing the government debt (Kumara & Pfau, 2012). Therefore, the Central bank invests over 90% of the funds in Government Treasury Bills and Bonds, earning a lower return than the market (Gamaniratne, 2007; Kumara & Pfau, 2012). Furthermore, this investment strategy puts EPF contributors at risk of facing old-age poverty due to a lack of retirement preparedness (De Mel, 2000).

Retirement preparedness is commonly defined as having 60 percent – 80 percent of preretirement income during retirement (Hanna et al., 2016). But despite the need to save for retirement, research shows a lack of retirement preparedness in the US (Barrett et al., 2022; Henager & Cude, 2016; Lusardi, 2019; Lusardi & Mitchell, 2014; Lusardi et al., 2010) and Asian countries (Chomik & Piggott, 2015; Van Katwyk, 2012). Research in the US has shown an association between retirement savings and behavioral aspects. These behavioral aspects discussed are lack of self-control, lower risk tolerance level, higher preference for current consumption, lack of resources (commonly overcome with enhanced financial literacy), and lack of understanding of the pension scheme (pension literacy). However, in Sri Lanka, macroeconomic conditions such as high inflation, low government investments, and low investment returns are also associated with the lack of personal savings.

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Based on our literature search, this is the first study to examine behavioral determinants (financial and pension literacy) of retirement preparedness in Sri Lanka. The evidence supports that low financial and pension literacy contributes to lower retirement preparedness. More specifically, those with lower financial literacy had lower retirement wealth (EPF balance). In addition, those with lower pension literacy had a lower propensity to plan, a lower perception of retirement income adequacy, and a lower EPF balance. This study examined how behavioral factors such as financial and pension literacy affect the EPF contributors' retirement preparedness using an online survey recruiting participants mainly through social media. Retirement preparedness was measured using two subjective measures (regarding planning for retirement and perception of retirement income adequacy) and one objective measure (retirement wealth).

2. Literature Review

2.1 Employee Provident Fund

The Employee Provident Fund (EPF) operates as a defined contribution (DC) plan. In a DC plan, employees are responsible for ensuring sufficient funds at retirement. In contrast, with a DB plan, employees are not required to make contributions or manage the investment to ensure adequate funds but are entitled to receive an income flow during retirement. In a DB, the employer's responsibility is to ensure the pension scheme has sufficient funds to support such payment to all its retirees. Thus, a DC pension system financially propels individuals to support retirement (Lusardi & Mitchell, 2014). However, placing the financial burden on individuals requires that they accumulate sufficient retirement wealth. The observed variations in wealth accumulation among individuals can be assigned to multiple factors, including demographic variables such as age, gender, education level, income (Fenton-O'Creevy & Furnham; 2022), marital status (Frémeaux & Leturcq, 2022), number of dependents, wealth inheritance, unexpected events, time preference (Martin et al., 2016), self-control (Ameriks et al., 2007; Griesdorn & Durband, 2016), risk preference (Neelakantan & Chang, 2010), and pension literacy (Ekerdt, 2002; Liebman & Luttmer, 2015).

2.2 Factors Affecting Retirement Preparedness

Previous studies have indicated a positive association between retirement preparedness and demographic factors such as age, those married have dependents, higher wealth inheritances, and lower unexpected events (Derby et al., 2022; Ngaowichai & Sripongpun, 2019). Similarly, behavioral aspects such as time preference (Martin et al., 2016), risk preference (Meeuwis, 2020), and self-control (Ameriks et al., 2007) have also shown an association with retirement preparedness. Studies have shown variation in time and risk preference across age groups and gender, resulting in retirement wealth accumulation variations. For example, using a sample from the National Longitudinal Survey of Youth (NLSY) found that those who favored present consumption accumulated a one-third lower retirement wealth than those who preferred future consumption (Martin et al., 2016). Secondly, those who lack self-control are less likely to sacrifice current consumption in anticipation of saving for the future (Ameriks et al., 2007; Griesdorn & Durband, 2016). Thirdly, because risk and return have a positive relationship, low-risk preference tends to invest in less risky financial instruments, resulting in lower returns and eventually affecting wealth accumulation. For example, in the case of females, single females and female-headed households accumulated significantly less wealth due to a risk aversion investment strategy (Neelakantan & Chang, 2010). While these behavioral aspects are inherent to humans, increased financial literacy can help to mitigate these behavioral challenges.

2.3 Financial Literacy and Retirement Preparedness

Financial literacy commonly refers to understanding financial concepts and applying them to economic decision-making (Goyal & Kumar, 2021; Huston, 2010). Understanding basic financial concepts such as inflation, compound interest, and risk lets individuals manage behavioral challenges such as preference for present

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consumption, lower self-control, and lower risk tolerance. For example, knowing that the highest benefits of compounding interest can be achieved by increasing the time the money is invested will encourage individuals to start saving for consumption during retirement as early as possible by forgoing current consumption. Similarly, understanding risk lets individuals effectively manage their investments by minimizing potential losses from risk and maximizing return, eventually leading to a higher wealth accumulation by retirement. Additionally, Dwyer et al. (2002) found a reduction in the differences in risk-taking behavior between females and males after controlling for financial knowledge. In other words, females with higher financial literacy levels had similar risk-taking behavior as their male counterparts. Bannier and Neubert (2016), echoing the previous findings, say that increasing financial literacy among females increased investments. These findings indicate that financial literacy is influential in narrowing the gender gap in risky investment decisions and is vital in achieving retirement preparedness by mitigating behavioral challenges.

2.4 Pension Literacy and Retirement Preparedness

Financial literacy as necessary knowledge in financial decision-making can positively impact retirement preparedness by mitigating behavioral challenges. To further improve retirement preparedness, one may need to know the details of pension schemes, such as contribution rates, investment strategy followed by the pension scheme, eligibility criteria for withdrawals, and other benefits attached to the pension scheme. For example, conducted an experimental study with control and test groups (Liebman & Luttmer, 2015). They found that the test group with information about the public pension program was four percent more likely to work a year longer than the control group. These results were similar in large data sets like HRS (Chan & Stevens, 2008) and other countries (Bucher-Koenen et al., 2017; Elinder et al., 2020; Landerretche & MartÍNez, 2013).

Financial and pension literacy have positively impacted retirement preparedness and saving behaviors. However, it is not clear about the direction of causality. In other words, is it financial/pension literacy causing retirement savings or the other way around? Panel data with fixed-effects regression and instrumental variable(IV) estimation was used in the literature to investigate the reverse causality effects. The study confirmed the positive effect of financial literacy on retirement planning (Alessie, van Rooij, & Lusardi, 2011). In particular, they used the same questions to measure financial literacy that we use in this study. Lusardi and Mitchell (2014) comprehensively reviewed research with instrumental variables and experimental approaches to examine a causal link between financial literacy and economic behavior. The study suggested that financial literacy is important in shaping financial decision-making, and the causality goes from knowledge to behavior but not from behavior to knowledge.

Further testing the causality of higher pension savings due to pension literacy, Landerretche and MartÍNez (2013), using an IV, the presence of a pensioner in the household to represent pension literacy, found that higher pension literacy predicts higher savings compared to those with lower pension literacy. Using the IV to represent pension literacy is essential because, although one can argue that higher retirement preparedness can cause higher pension literacy, higher retirement preparedness may not cause having a pensioner in the household. On the other hand, a pensioner in the household may impart important information about the pension system, or members may see and learn retirement saving behavior that can influence retirement preparedness through improved pension literacy. In sum, it is evident that financial and pension literacy have a causal relationship with retirement preparedness.

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3. Conceptual Framework

The life cycle hypothesis (LCH) may provide the theoretical framework to explain how financial and pension literacy relates to financially preparing for retirement. LCH explains individuals' savings and consumption patterns over their lifetime (Modigliani, 1986). According to the LCH model, rational individuals will save while they work and use it as a source of support during retirement. This allows them to smoothen the consumption utility throughout their lifetime (Browning & Crossley, 2001; Derby et al., 2022; Griesdorn et al., 2014). Figure 1 below explains how a rational individual smoothens consumption. As explained by the LCH hypothesis, a rational individual smoothens consumption by borrowing during stage 1, saving during stage 2, and dissaving during stage 3.

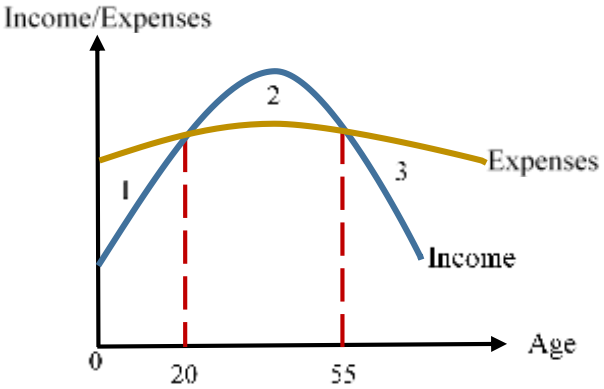

Figure 1. Life cycle hypothesis (LCH)

LCH suggests that income fluctuates across the life cycle (i.e., age), so people should save for retirement to smoothen their consumption. However, this basic model may only explicitly propose factors to explain individual differences in retirement saving except for life cycle (i.e., age). This is mainly because the LCH model follows some assumptions of traditional economic models, such as; rational behavior, no uncertainty, perfect information, or constant preference. But, in retirement saving, some are not rational, some have different time and risk preferences, and some may face unexpected events such as unemployment or health problems, challenging them to save for retirement. Moreover, when people plan for retirement savings, LCH assumes they have all financial knowledge, such as market interest rate, future income, or where/how to invest. This assumption is far from reality; in an environment with imperfect information, an individual needs to have financial knowledge related to financial concepts (return, inflation, and risk) and pension concepts (contribution rates, withdrawal criteria, and investment criteria) to allocate resources optimally between current and future consumption which will affect retirement savings. Figure 2 is the conceptual framework focusing on imperfect information for retirement savings.

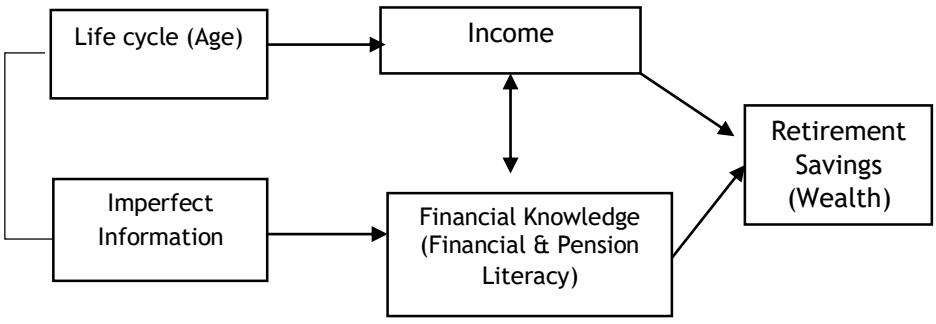

Figure 2. Conceptual framework

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Financial literacy is commonly defined as understanding and applying financial concepts to economic decision-making (Huston, 2010). However, this assumption does not explicitly consider financial and pension literacy as a significant determinant of retirement savings, which is far from reality (van Rooij et al., 2012). Lusardi and Mitchell (2014) found that financial literacy positively influences financial decision-making and behaviors. Similarly, understanding one's pension scheme is vital to be financially prepared for retirement.

Financial literacy may affect preparation for retirement savings in several ways; first, understanding financial concepts. That is, if they know the economic life cycle, they can notice the need for retirement savings during the early years of their career. If they understand the concepts and advantages of compound interest, they may begin early to save for retirement and take advantage of the compounding. If they know about inflation and the possibility of decreasing purchasing power, they may be concerned about annual inflation rates in estimating their retirement savings needs, leading to better preparation. Suppose they understand the concept of risk and the negative relationship between risk and return. In that case, they may understand their risk tolerance level and their retirement savings' possible gains and losses. Second, through its application. Presume they know the simple consumption formula based on LCH. In that case, they can estimate their monthly contribution rate out of their monthly income for retirement savings. Third, suppose they apply the concept of risk when planning their retirement savings. They can determine the estimated return from financial products based on different investment risk levels. If they have the propensity to be risk-averse and invest in less risky assets and money market instruments, they may expect low returns. As a result, they may think about a higher monthly contribution rate to meet their retirement savings needs and vice versa if they are risk-takers.

Based on potential channels through which financial literacy may influence financial decision-making retirement savings behaviors and experimental findings with an association between financial literacy and financial behavior discussed in the introduction, we hypothesize that:

Hypothesis 1: Financial literacy is positively related to retirement preparedness

While financial literacy is needed for retirement saving at a general level, it may not provide individuals with pension-related knowledge. Pension-related or pension-specific knowledge is the expertise about benefits from the pension scheme, contribution rates, the investment strategy followed by the managers, and the eligibility criteria to claim benefits (Adeabah, 2020; Ekerdt, 2002; Mitchell, 1988). Pension-specific knowledge or pension literacy will affect retirement preparedness by altering practical decisions like contribution rates, investment strategy, or retirement age.

More specifically, pension literacy is essential. Knowing how much the individual (employee) and the employer contribute to the retirement fund will plan their contributions sufficiently to meet future financial needs. Furthermore, suppose they understand the investment strategy; whether the fund invests in fixed-income securities, equities, mutual funds, or index funds will impact the investment strategy for their retirement fund growth. In addition, if individuals are aware of the withdrawal method, whether the withdrawal is an annuity or a lump sum will let them make suitable decisions to manage the funds during retirement better. Finally, if they know the eligibility criteria to claim benefits, they could better maximize them by not claiming their retirement fund prematurely. Based on the above discussion and the experimental evidence of the positive relationship between pension literacy and retirement preparedness, we hypothesize that:

Hypothesis 2: Pension literacy is positively related to retirement preparedness

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4. Methods

4.1 Participant

This study distributed the questionnaires for an online survey through two Facebook pages related to a page discussing financial matters in Sri Lanka and a university between April 1 and October 31, 2020. The survey asked questions related to financial/pension literacy and demographic variables. A total of 175 private sector employees participated in the survey. This study excluded fifteen participants who did not meet the inclusion criteria from the study (i.e., did not contribute EPF (10 respondents) or did not provide the answer to question (5)). Therefore, the current study includes sample sizes of 142 (subjective measure) and 115 (objective measure) after deleting observations with missing Salary and EPF balance.

4.2 Measurements

While relevant independent variables in our study, financial literacy, and pension literacy, are independent variables, retirement preparedness is the dependent variable. However, within the Sri Lankan context, these variables are new research areas, resulting in a lack of measures that evaluate these within the context of Sri Lanka. Thus, this study used measures established within the United States after adapting to the target culture as Beaton et al. (2000) prescribed. This study has measured retirement preparedness both subjectively and objectively. This study used subjective measures in the Health and Retirement Study (HRS) and the Survey of Consumer Finance (SCF). While the HRS is a longitudinal survey of over 20,000 Americans representing those above 50, the SCF collects from about 6,500 households with respondents at least 18 years old. The HRS asked respondents to rate "how much have you thought about retirement?" on a scale ranging from "hardly" to "a lot" (Lusardi, 2007).

The HRS questions indicated how much the responder had prepared for retirement. The measure used by SCF measured the participant's perception of retirement income adequacy. Adopting the measure from SCF, on a scale of 1 being "totally inadequate" to 5 being "totally adequate," I asked the respondents to rate the adequacy of their anticipated income from EPF and other retirement savings. This study has created two categorical variables for retirement preparedness: a variable with four categories from HRS, retirement income adequacy: and a variable with three categories from SCF. We coded responses for totally inadequate and inadequate as low retirement income adequacy, "satisfactory" as a medium, and "adequate" and "totally adequate" as high. We changed the SCF variable from five categories due to few responses in some categories.

This study used the self-reported EPF balance to measure objective retirement preparedness. Using a self-reported EPF balance as a measure has several advantages in Sri Lanka, with little knowledge of retirement savings and limited public availability of individual pension data. In research, it is commonly accepted that those unwilling to provide dollar net worth values are willing to respond to less direct questions (Juster & Suzman, 1995; Smith, 1995). Therefore, we asked respondents to record the exact EPF balance or asked an indirect question from those who did not answer the exact value, "how many times is your current EPF balance as your annual income." Eight of 115 participants answered the indirect question.

Measures of financial literacy in this study reflect the understanding of financial concepts. According to previous research with various populations and large sample sizes, demographic variables such as educational level, age, gender, race, or marital status cannot fully explain the differences in financial literacy (Young et al., 2017) but better explained with the understanding of financial concepts and related numeracy (Bönte & Filipiak, 2012; Lusardi & Mitchell, 2014). Therefore, financial literacy was measured by asking three multiple-choice questions about interest, inflation, and risk. These questions have been used in multiple surveys in the US (Lusardi & Mitchell, 2009), including public surveys such as HRS and SCF, and across the world (Bönte & Filipiak, 2012; Klapper et al., 2014; van Rooij et al., 2012) tested the knowledge of (1) compound interest, (2) inflation, and (3) risk diversification. We created three binary variables (1 if a respondent correctly answers, 0 otherwise) to

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assess financial literacy based on the three measures suggested by Klapper et al. (2013); Allgood and Walstad (2016).

HRS included questions to evaluate the respondents' understanding of their pension plan (Ekerdt, 2002; Mitchell, 1988). These questions tried to understand respondents' awareness about (1) Pension plan type, (2) Pension contribution rate, and (3) Pension benefits. We adapted the Questions to the Sri Lankan context by reflecting on the program details of EPF and changing the terminology to EPF. In addition, like financial literacy measures, we created three binary variables (1 if a respondent correctly answers, 0 otherwise). Appendix B includes the questions used in the survey. In addition, the survey asked various sociodemographic questions in the analyses as control variables. These sociodemographic variables included age, gender, marital status, dependents, monthly income, education, and homeownership. In addition, 14 out of 143 respondents provided ranges (10 brackets) of income rather than an exact amount regarding monthly income. For these respondents, monthly income was a lower amount from a range bracket was used. Monthly income was log-transformed to minimize the skewness (Lütkepohl et al., 2012).

4.3 Analysis

This non-experimental study uses an online survey to assess financial and pension literacy's roles in retirement preparedness. This study used ordered logistic (Ologit) regressions and ordinary least squares (OLS) regressions to test the two hypotheses. The two subjective measures were categorical variables with an identifiable ordering of the category levels. Thus, first, we used the Ologit regression to estimate the possible association between financial and pension literacy with the respondents' (n=142) retirement preparedness measured as a subjective measure (1. level of planning for retirement and 2. their perception of retirement income adequacy). Second, we used the OLS regression to assess the role of financial and pension literacy on respondents' (n=115) wealth accumulation (objective measure), a continuous variable in LKR (Sri Lanka currency). Each regression had five models successively incorporating control and relevant independent variables. For example, model 1 incorporates only control variables; model 2 adds Financial literacy measures to model 1; in model 3, pension literacy measures are added to model 1; in model 4, both financial and pension literacy variables are added to model 1, and finally in model 5 interaction term between financial and pension literacy was added to the model.

5. Findings

5.1 Respondent's Characteristics

Table 1. shows that the sample's average age was 33.9, with over 70 percent of respondents below 34. Of the respondents, 35.9% were females (population female labor force participation rate - 34.5%) (Central Bank of Sri Lanka, 2019). Most (85.5%) were college educated or above (four times higher than the population). The mean monthly salary and EPF balance are LKR113,820 (USD615) and LKR 1,870,950 (USD 10,113), which is about respectively five times (Central Bank of Sri Lanka, 2019) and 40 times (Employee Provident Fund, 2016) higher than the general population.

Table 1. Respondent's characteristics

Characteristics	%
Age (years)	
Mean *(SD)*	33.9 (8.7)
29 or younger	25.2
30–34	45.3
35 or older	29.6
Female	35.9
Highest level of education	
Less than high-school	0.6
High school	1.9
Associate college	11.9
College and above	85.5

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Table 1. Respondent's characteristics (continue)

Characteristics	%
Married	66.7
Number of dependents, including children	
0	50.3
1	14.5
2	24.5
3+	10.6
Homeownership	52.8
Monthly salary [a]	
Mean	113,820
Median	100,000
EPF Balance [a]	
Mean	1,870,950
Median	900,00
Number of participants	160

Note: [a] Sri Lankan rupee (LKR) exchange rate per US dollar in 2020 is 185.

5.2 Retirement Preparedness Level by Financial and Pension Literacy

Table 2 presents the bivariate relationship between retirement preparedness (Panel A and B - subjective, Panel C - objective) and financial and pension literacy. Financial literacy positively correlates with retirement preparedness (objective measure only). For example, those who knew about inflation and risk had a statistically higher EPF balance.

Table 2. Retirement preparedness level by financial and pension literacy

Panel A: Planning for retirement (%)	A lot	Somewhat	A little	Hardly	x^2
Financial Literacy					
Compound Interest	87.1	89.6	82.9	86.8	0.87
Inflation	87.1	75.0	75.6	76.3	2.13
Risk	87.1	83.3	78.1	81.6	1.16
Pension Literacy					
Withdrawal method	22.6	29	14.6	10.5	2.90
Investment	67.7	39.6	53.7	29.0	12.84***
Contribution	83.9	93.8	92.7	84.2	3.33
Panel B: Adequacy of retirement income (%)		High	Medium	Low	x^2
Financial Literacy					
Compound Interest		85.0	84.0	93.0	2.04
Inflation		75.0	77.3	81.4	0.44
Risk		87.5	76.0	88.4	4.00
Pension Literacy					
Withdrawal method		17.5	20.0	13.9	0.70
Investment		60.0	46.7	32.6	6.81**
Contribution		92.5	90.7	83.7	2.04
Panel C: EPF Balance			Correct answers (M)[a]	Incorrect answers (M)[a]	*t*(111)
Financial Literacy					
Compound Interest			2,196,042	2,080,714	0.00
Inflation			2,506,561	926,647	1.66**
Risk			2,450,227	818,973	1.60**
Pension Literacy					
Withdrawal method			3,422,391	1,894,824	1.79**
Investment			3,145,039	1,281,671	2.57***
Contribution			2,170,812	2,353,750	0.46

Note: *** $p < 0.01$, **$p < 0.05$, *$p < 0.01$; [a]M-mean

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Pension literacy is also strongly associated with subjective and objective retirement preparedness measures. More specifically, those who knew where the Central Bank invested their contributions for retirement perceived their level of savings as adequate and had a higher EPF balance. Additionally, those who knew funds could only be withdrawn as a lump sum had a higher EPF balance.

5.3 Planning for Retirement

Table 3 reports regression results of the association between financial/pension literacy and retirement planning. Overall, models 2 to 5 show that 1) financial literacy was not associated with retirement planning, 2) pension literacy was statistically significantly associated with retirement planning, and 3) there was no synergic effect between financial literacy and pension literacy on retirement planning. In model 5, the statistically insignificant interaction term between financial and pension literacy indicates no synergic or moderating effects between financial and pension literacy on retirement planning. Interestingly, in model 5, knowing the withdrawal method turned statistically significant, but it is at a 10 percent significant level. Quantitatively, those who knew where their contributions were invested had 1.9 times higher odds of retirement planning than those who did not. Among demographics, only being male had a statistically significant association with retirement planning.

Table 3. Ordered logistic regression results for retirement planning

Variable	**Retirement planning**				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
	OR[a] (SE)[b]	**OR (SE)**	**OR (SE)**	**OR (SE)**	**OR (SE)**
Demographics					
Age					
a. 30-34	1.00	0.97	1.14	1.08	1.04
	(0.44)	(0.43)	(0.51)	(0.49)	(0.48)
b. Above 35	1.55	1.54	1.47	1.44	1.35
	(0.86)	(0.86)	(0.83)	(0.82)	(0.77)
Male	2.43**	2.55***	2.44**	2.52**	2.46**
	(0.86)	(0.92)	(0.86)	(0.92)	(0.90)
Married	0.87	0.86	0.90	0.89	0.89
	(0.31)	(0.31)	(0.33)	(0.32)	(0.33)
Homeowners	1.51	1.62	1.47	1.60	1.66
	(0.51)	(0.56)	(0.49)	(0.55)	(0.58)
Have dependents	1.13	1.10	1.18	1.17	1.25
	(0.36)	(0.36)	(0.38)	(0.38)	(0.42)
College-educated	0.50	0.49	0.46	0.41	0.41
	(0.25)	(0.27)	(0.24)	(0.23)	(0.23)
Log monthly income	1.46	1.43	1.46	1.42	1.40
	(0.35)	(0.35)	(0.36)	(0.35)	(0.35)
Financial Literacy					
Compound interest		0.95		1.15	1.22
		(0.53)		(0.66)	(0.71)
Inflation		0.77		0.76	0.80
		(0.37)		(0.36)	(0.38)
Risk		1.55		1.76	1.96
		(0.78)		(0.91)	(1.04)
Pension Literacy					
Investment			1.89**	1.90**	2.14**
			(0.61)	(0.62)	(0.74)
Contribution rate			0.69	0.64	0.65
			(0.37)	(0.35)	(0.35)
Withdrawal method			1.76	1.86	2.56*
			(0.73)	(0.77)	(1.33)

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Table 3. Ordered logistic regression results for retirement planning (continue)

Variable	Retirement planning				
	(1)	(2)	(3)	(4)	(5)
	OR[a] (SE)[b]	OR (SE)	OR (SE)	OR (SE)	OR (SE)
Financial Literacy and Pension Literacy interaction					0.41 (0.35)
Overall model evaluation					
Likelihood Ratio chi2(15)	22.8***	23.8**	29.1***	30.4***	31.5***
Pseudo R^2	0.06	0.06	0.07	0.08	0.08
Observations	142	142	142	142	142

Note. Reference is age below 30, female, not married, non-homeowners, no dependents, no college education; [a] OR – Odds Ratio [b]; SE – Standard Error; *** p<0.01, ** p<0.05, * p<0.1

5.4 Adequacy of Retirement Income

Table 4 shows regression results between financial/pension literacy and retirement income adequacy. Similar to the pattern in Table 3, the results across all five models show no relationship between financial literacy and participant perception of retirement income adequacy (models 2 and 4). Second, there was a positive relationship between pension literacy and retirement income adequacy. Quantitatively, those with pension literacy had about 1.8 times higher odds of perceiving adequate retirement income (models 3 and 4). Third, there was no synergic effect between retirement income adequacy, financial literacy, and pension literacy (model 5). From the array of demographics controlled in the analyses (models 1 to 5), being married and homeowners had statistically significantly higher odds (about two times) of feeling they have adequate retirement savings. Nevertheless, those with dependents had about 50% lower odds of perceiving their savings were adequate than those without dependents.

Table 4. Ordered logistic regression results for retirement income adequacy

Variables	Retirement income adequacy				
	(1)	(2)	(3)	(4)	(5)
	OR[a] (SE)[b]	OR (SE)	OR (SE)	OR (SE)	OR (SE)
Demographics					
Age					
a. 30-34	0.77	0.82	0.71	0.77	0.76
	(0.34)	(0.38)	(0.34)	(0.37)	(0.37)
b. Above 35	1.06	1.23	0.92	1.08	1.06
	(0.58)	(0.69)	(0.51)	(0.61)	(0.60)
Male	1.67	1.79	1.65	1.79	1.74
	(0.62)	(0.67)	(0.62)	(0.68)	(0.67)
Married	2.11**	2.14**	2.12**	2.12**	2.11**
	(0.80)	(0.81)	(0.80)	(0.81)	(0.81)
Homeowners	1.85*	2.00**	1.81*	1.92*	1.99*
	(0.64)	(0.70)	(0.63)	(0.68)	(0.71)
Have dependents	0.45**	0.40***	0.45**	0.39***	0.42**
	(0.15)	(0.14)	(0.15)	(0.14)	(0.15)
College-educated	0.64	0.74	0.62	0.75	0.77
	(0.33)	(0.41)	(0.33)	(0.43)	(0.44)
Log monthly income	1.29	1.33	1.32	1.37	1.35
	(0.32)	(0.34)	(0.34)	(0.37)	(0.37)

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Table 4. Ordered logistic regression results for retirement income adequacy (continue)

Variables	Retirement income adequacy				
	(1)	(2)	(3)	(4)	(5)
	OR[a] (SE)[b]	OR (SE)	OR (SE)	OR (SE)	OR (SE)
Financial Literacy					
Investment			1.86*	1.84*	2.05*
			(0.63)	*(0.63)*	*(0.76)*
Inflation		0.44		0.43	0.43
		(0.23)		(0.23)	(0.24)
Risk		1.40		1.29	1.42
		(0.70)		(0.67)	(0.75)
Withdrawal method			1.03	1.08	1.47
Overall model evaluation					
Likelihood Ratio	22.0***	24.8***	27.5***	30.3***	31.0***
Pseudo R^2	0.07	0.08	0.09	0.10	0.10
Observations	142	142	142	142	142

Note. Reference is the age below 30, female, unmarried, non-homeowners, no dependents, no college education; [a] *OR - Odds Ratio* [b] *SE - Standard Error;* *** p<0.01, ** p<0.05, * p<0.1

5.5 Retirement Wealth

The results of OLS regression to estimate the association between financial/pension literacy and EPF balance for retirement savings are shown in Table 5. The results are similar to Tables 3 and 4, using subjective measures of retirement preparedness. Pension literacy positively correlated with EPF balance (models 3 and 4), and there were no statistically significant synergic effects between financial and pension literacy (model 5). Nevertheless, there was also a difference between the subjective and objective measures of retirement preparedness.

Table 5. Ordinary least squares regression results for EPF balance

Variables	EPF Balance (Log)				
	(1)	(2)	(3)	(4)	(5)
	Coef (SE)	Coef (SE)	Coef (SE)	Coef (SE)	Coef (SE)
Demographic					
Age					
a. 30-34	1.25***	1.16***	1.36***	1.28***	1.27***
	(0.37)	(0.37)	(0.37)	(0.37)	(0.37)
b. Above 35	2.19***	2.14***	2.16***	2.12***	2.13***
	(0.44)	(0.44)	(0.44)	(0.43)	(0.43)
Gender	-0.28	-0.28	-0.36	-0.36	-0.35
	(0.31)	(0.30)	(0.30)	(0.30)	(0.30)
Marital Status	0.27	0.21	0.31	0.25	0.10
	(0.31)	(0.31)	(0.31)	(0.31)	(0.30)
Homeownership	0.14	0.06	0.18	0.10	0.10
	(0.29)	(0.29)	(0.29)	(0.29)	(0.29)
Dependents	-0.40	-0.36	-0.35	-0.30	-0.33
	(0.26)	(0.27)	(0.26)	(0.26)	(0.27)
Education	0.00	-0.23	-0.04	-0.33	-0.44
	(0.38)	(0.42)	(0.37)	(0.41)	(0.41)
Log monthly income	0.53***	0.46**	0.53***	0.44**	0.45**
	(0.19)	(0.19)	(0.19)	(0.19)	(0.19)
Financial Literacy					
Compound Interest		-0.44		-0.29	-0.33
		(0.53)		(0.53)	(0.54)
Inflation		0.13		0.02	0.02
		(0.45)		(0.44)	(0.44)
Risk		0.92**		1.14**	1.08**
		(0.46)		(0.45)	(0.47)

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Table 5. Ordinary least squares regression results for EPF balance (continue)

Variables	EPF Balance (Log)				
	(1)	(2)	(3)	(4)	(5)
	Coef (SE)	Coef (SE)	Coef (SE)	Coef (SE)	Coef (SE)
Pension Literacy					
Investment			0.55**	0.62**	0.56*
			(0.27)	(0.26)	(0.29)
Contribution Rate			0.16	0.11	0.12
			(0.53)	(0.54)	(0.54)
Withdrawal Method			0.47	0.55*	0.41
			(0.33)	(0.32)	(0.43)
Financial Literacy and Pension Literacy Interaction					0.33
					(0.67)
Constant	6.28***	6.76***	5.79***	6.26***	6.67***
	(2.08)	(2.07)	(2.14)	(2.10)	(2.12)
Overall model evaluation					
F test	8.56***	6.92***	7.06***	6.37***	5.92***
R-squared	0.39	0.42	0.43	0.47	0.47
Observations	115	115	115	115	115

Note. Reference is the age below 30, female, not married, non-homeowners, no dependents, no college education; [a] Coeff – Co-efficient; [b] SE – Standard Error; *** p<.01, ** p<.05, * p<.1

Financial literacy had a statistically significant relationship with EPF balance, unlike in Tables 3 and 4. In models 2 and 4, risk as a measure of financial literacy was significant in achieving higher retirement savings after controlling for demographic, pension literacy, and other financial literacy measures. Those who understood the relationship between risk and return have 1.5 to 2 times (i.e., [exp (0.92 or 1.14) -1] *100) higher EPF balance than those without it. Like previous analyses of subjective retirement preparedness measures, knowing where the central bank invests the EPF contributions and withdrawal method had a statistically significant 70% to 85% greater EPF balance. Age and income were significantly associated with a higher EPF balance among demographics. Compared to those younger than 29, EPF balances of 30-34 and 35+ age groups were 2.3 to 7.2 times higher. A 1% higher monthly income can result in a nearly 0.5% higher EPF balance (the coefficient of 0.44 (model 4): percentage change in EPF balance/ percentage change in monthly income). The relationship between income and EPF balance indicates that an LKR 1,138 (1% of the mean: LKR113,820 in Table 1) higher monthly income, EPF balance is expected to increase by LKR9,354 (0.5% of the mean: LKR1,870,950 in Table 1).

5.6 Sensitivity Analysis

Table 6 displays the sensitivity analysis results for financial/pension literacy and the interaction using indices rather than individual questions, with the three dependent variables measured in tables 3, 4, and 5 for models 4 and 5). In summary, the results are similar to the findings in Tables 3, 4, and 5.

Even though financial and pension literacy indices were used for the regression analyses instead of individual measures, financial literacy did not have a statistically significant association. However, pension literacy was statistically associated with all models except for model 5 of retirement planning and EPF balance. To test the robustness of the synergy effect, we used a categorical interaction term instead of the continuous variable; the previous findings in Tables 3, 4, and 5 did not change.

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Table 6. Robustness check of financial literacy and pension literacy measures

Variable	Retirement Planning		Retirement Income Adequacy		log (EPF balance)	
	(4)	(5)	(4)	(5)	(4)	(5)
	OR (SE)	OR (SE)	OR (SE)	OR (SE)	OR (SE)	OR (SE)
Financial Literacy (FL.) Index	0.99 (0.22)	1.15 (0.53)	0.8 (0.19)	0.88 (0.43)	0.17 (0.19)	-0.17 (0.43)
Pension Literacy (PL.) Index	1.51* (0.32)	1.38 (0.38)	1.56** (0.34)	2.05** (0.61)	0.42** (0.19)	0.28 (0.26)
Interaction						
FL (Correct) PL (Correct)		0.78 (0.86)		0.32 (0.36)		1.29 (0.93)
FL (Correct) PL (Incorrect)		0.83 (0.67)		0.90 (0.78)		0.58 (0.75)
FL (Incorrect) PL(Correct)		3.62 (4.06)		0.44 (0.52)		-0.41 (1.06)
FL (Incorrect) PL(Incorrect)			Reference group			

Note. All other variables in Tables 5, through 7 included; [a] Coeff – Co-efficient [b] SE – Standard Error; *** p<0.01, ** p<0.05, * p<.1

6. Discussion

The results indicate three main findings regarding the retirement preparedness of private sector employees in Sri Lanka. First, risk, one financial literacy measure, was positively associated with the objective retirement preparedness measure (EPF balance). This finding is new within the Sri Lankan context but not surprising based on the studies done with the US population. Studies in the US showed that greater financial literacy was associated with higher net worth. This hypothesis was tested with various populations, including educated African Americans (Young et al., 2017), young adults (Lusardi & Mitchell, 2007), teachers (Widyastuti et al., 2020), and older Americans (Mitchell & Lusardi, 2011).

Out of the three measures of financial literacy, we only found a positive and statistically significant association between risk with EPF balance. A possible explanation is that risk may be a complex concept to understand compared to interest and inflation concepts. Thus, the risk measure better differentiates among those with different levels of financial literacy (Lusardi & Mitchell, 2014; Mitchell & Lusardi, 2011). These results imply that those who understand the risk concept might have made investments to enhance human capital, enabling a higher monthly income supporting a higher EPF contribution to offset the impacts of low return earned by the EPF. However, another primary result says that financial literacy had no statistically significant relationship with *subjective measures* of retirement preparedness, signifying that regardless of their financial literacy levels, their thinking or perception of retirement preparedness is the same. This result is somewhat different from the studies in the US and other countries. For instance, several studies found a statistically significant relationship between planning for retirement and financial literacy (Mitchell & Lusardi, 2011; van Rooij et al., 2012) and retirement income adequacy and financial literacy (Reyers, 2018; Segel-Karpas & Werner, 2014; Van Dalen et al., 2010). However, Kim and Hanna (2015) found an objective and subjective measure of retirement preparedness, particularly among those with inadequate savings. Therefore, it may be possible that there is some degree of overestimation in the perceived retirement preparedness. Additional studies are needed to understand the gaps between subjective and objective measures in Sri Lank and the US.

The second finding was a statistically significant positive relationship between pension literacy and subjective (1.9 and 1.8 times higher odds of retirement planning and retirement income adequacy, respectively) and objective (70% higher EPF) retirement preparedness measures. These findings are also new in the Sri Lankan

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context but similar to the results in the US (Ekerdt, 2002; Liebman & Luttmer, 2015; Mitchell, 1988) and outside of the US (Adeabah, 2020; Landerretche & MartÍNez, 2013) with an only some experimental studies finding no differences (Finseraas & Jakobsson, 2014; Finseraas et al., 2017; Mastrobuoni, 2011). These findings may need to be looked at under the EPF fund management system. Over 90% of EPF contributions are invested in government debt instruments, triggering return rates far below employees' expectations from an investment management strategy. Suppose one understands this "no-choice" investment system earns a lower return. In that case, one may consider it in preparing for retirement by enhancing monthly contributions and eventually having a higher perceived retirement income adequacy and retirement savings. However, knowledge about the withdrawal method only had a statistically significant relationship with EPF balance and not the subjective measures. The withdrawal method is important because the illiteracy of the withdrawal method can hamper the effective management of the windfall from the contributions to the EPF. Ineffective management of the windfall may cause retirees to outlive the lump sum received.

Finally, there is no synergy effect between financial and pension literacy on retirement preparedness across all measures, indicating the unique impact of both financial and pension literacy on retirement preparedness. Overall, this study illustrates the importance of financial and pension literacy on the retirement saving behavior of private-sector employees in Sri Lanka.

To our understanding, these findings are one of the initial studies evaluating financial and pension literacy's impact on retirement preparedness in Sri Lanka. However, the results should be used with caution. First, the sample was convenient, administered only in English and via online platforms, this excludes a part of the population that is not tech-savvy, English-speaking, or has limited internet access, most likely with less financial and pension literacy (Volpe et al., 2002). Second, we used a convenient sample; therefore, the results cannot be generalized to the broader Sri Lankan community. Thirdly, our findings suggest a relationship between financial/pension literacy and retirement preparedness but may not conclude a causal relationship. However, the previous studies findings in various other populations have shown the causal relationship between financial and pension literacy on retirement preparedness.

Further studies are needed with longitudinal data and instrumental variables. Fourthly, as a first step to understanding its impact on retirement preparedness in Sri Lanka, we used basic financial literacy measures. Advanced or sophisticated financial literacy measures would have more effectively differentiated the financially literate and illiterate respondents (Bumcrot et al., 2013; Mitchell & Lusardi, 2011; van Rooij et al., 2011), which is another objective for further studies. Finally, a benchmark replacement rate developed considering the living cost in Sri Lanka can further improve the objective measure of retirement preparedness (Kim & Hanna, 2015; Kim et al., 2014). However, at the time of the study benchmark replacement rate was not available for Sri Lanka.

7. Conclusion

Financial preparedness for retirement continues to be important for South Asia's fastest-aging population to avoid old-age poverty and dependence on the government for social welfare services. Several important implications can be suggested to improve policy, financial education, and future studies. First, the most significant implication to policymakers is diversifying the EPF fund. Diversifying the investment strategy will enhance EPF balance for all employees, even without active engagement, to enhance financial, pension literacy, and human capital (for increased earnings). Additionally, strategies such as hierarchical hypertext structure in brochures and educational materials improve pension literacy.

Second, pedagogy in financial education is vital to promote a change in retirement preparedness behaviors. Therefore, it is important for workplace educators to include aspects of financial and pension literacy. These aspects may include concepts such:1)

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risk diversification; 2) investment instruments used by the central bank; 3) the return earned by the EPF; 4) potential investment cost; 5) when the EPF can be withdrawn, and 6) how to withdraw the EPF. In addition, since retirement saving is a long-term behavior, educators must continuously engage their audience with pension literacy material, as training leads mostly to short-term behavioral changes but not long-term ones.

Finally, previous research has focused a lot on higher financial literacy, leading to higher retirement literacy due to better financial behavior. However, this study looked at higher retirement readiness for those with higher retirement literacy among highly educated and financially literate private sector employees in Sri Lanka. In line with these findings, examining the relationship between retirement literacy and retirement readiness with other populations is very important.

8. Recommendation

Following the research results, it is recommended that the central bank diversifies the EPF investments, allowing the investment to receive at least a market rate of return. In addition, financial and pension literacy are included in workplace educational programs. Further research on pension literacy's impact on retirement preparedness needs to be conducted

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