A Study on Converting Lottery Money into Pensions for Thai Informal Workforce

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Abstract

The Mercer CFA Institute Global Pension Index shows that Thailand has had the world's worst pension system for several years. This paper addresses the weaknesses of the Thai pension system, particularly in providing for the informal sector workforce. Despite existing government pension schemes being voluntary, their effectiveness is limited, with a significant portion of funds being allocated towards lottery tickets. As a solution, the paper proposes establishing a voluntary savings program named the "Government Savings Lottery Fund for Retirement." This program would convert lottery money into retirement benefits, with pension levels determined by factors such as the amount invested, duration of participation, and fund management returns. The proposed system mirrors the National Savings Fund (NSF) in calculating pensions and offers individual capital management accounts. Payments would commence at age 60 as lifetime monthly payments. This proposed system aims to expand labor protection, increase retirement income, ensure financial sustainability, strengthen the capital market, and relieve pressure on government finances

Keywords: Lottery, Pension, Retirement, Informal workforce, Government Savings Lottery Fund for Retirement

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โครงการศึกษาการเปลี่ยนเงินหวยเป็นเงินบำนาญสำหรับแรงงานนอกระบบของไทย

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Abstract

ดัชนีเงินบำนาญทั่วโลกของสถาบัน Mercer CFA แสดงให้เห็นว่าประเทศไทยมีระบบบำนาญที่แย่ที่สุดในโลกมาหลายปีติดต่อกัน บทความนี้กล่าวถึงจุดอ่อนของระบบบำนาญสำหรับแรงงานนอกระบบของไทย ถึงแม้ว่าไทยจะมีระบบบำนาญสำหรับแรงงานนอกภายใต้ระบบกองทุนการออมแห่งชาติ (NSF) ซึ่งเป็นการให้สมัครเป็นสมาชิกโดยสมัครใจ แต่ยังมีสมาชิกที่จ่ายเงินสมทบเข้ากองทุนจำนวนน้อย สมาชิกส่วนใหญ่ยินดีจ่ายเงินซื้อหวยมากกว่าจ่ายเงินเข้ากองทุนการออมแห่งชาติ เพื่อแก้ปัญหานี้ บทความนี้ได้เสนอให้จัดตั้งโครงการออมทรัพย์โดยสมัครใจชื่อ "กองทุนสลากกินแบ่งรัฐบาลเพื่อการเกษียณอายุ" เป็นโครงการที่แปลงเงินหวยเป็นผลประโยชน์เมื่อเกษียณอายุ โดยระดับเงินบำนาญจะกำหนดโดยปัจจัยต่าง ๆ เช่น จำนวนเงินที่ลงทุน ระยะเวลาการเข้าร่วมกองทุน และผลตอบแทนจากการจัดการเงินกองทุน ในการคำนวณเงินบำนาญและจัดทำบัญชีเงินทุนส่วนบุคคล ระบบที่นำเสนอนี้ได้ใช้วิธีการเดียวกับระบบกองทุนการออมแห่งชาติ (NSF) โดยจะจ่ายเงินบำนาญให้สมาชิกเมื่ออายุครบ 60 ปีทุกเดือนตลอดชีพ ระบบที่นำเสนอนี้มีจุดมุ่งหมายเพื่อขยายการคุ้มครองแรงงาน เพิ่มรายได้หลังเกษียณ สร้างความยั่งยืนทางการเงิน สร้างความแข็งแกร่งให้กับตลาดทุน และลดแรงกดดันต่อการเงินภาครัฐ

คำสำคัญ: หวย เงินบำนาญ เกษียณอายุ แรงงานนอกระบบ กองทุนสลากออมทรัพย์รัฐบาลเพื่อการเกษียณอายุ

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Introduction

Thailand became an aged society in 2023. Last year, the proportion of the elderly in the total population increased to 20%, and the dependency rate of people aged 60 years and over is expected to increase from 26.7% in 2019 to 56.2% in 2040. As of 2022, according to the Mercer CFA Institute Global Pension Index, Thailand was found to have the world's worst pension system, securing the last position at 44th and receiving a D grade. This ranking aligns with Argentina, India, and Turkey. Among ASEAN countries surveyed, Thailand's ranking falls behind Singapore, Malaysia, Indonesia, and the Philippines.

One of the significant weaknesses of the Thai pension system addressed in this paper is the one for Thai people who work in the informal sector. In 2019, there were 20.34 million Thai people working in the informal sector, and more than 14 million people, or 68.8 percent of them, were not yet enrolled in the old-age savings system. For those who are covered by the government pension system, their retirement income is insufficient for maintaining a stable life in old age (Pornpen Vora-Sittha and Parichat Klingthong, 2021). This aligns with proposals from various sectors aimed at resolving the problem of inadequate old-age income (Bank of Thailand, 2021). As the hope of relying on financial support from their children for the elderly fades due to factors such as increased longevity, declining birth rates, and changing family structures, the future dependence on children becomes more challenging. It is necessary for the Thai government to play a more significant role in managing an old-age income system.

A study of benefits that retirees should receive by Pornpen Vora-Sittha and Parichat Klingthong (2021) found that existing pension funds did not provide enough incentives to attract the majority of informal workers to join the program. They would rather put their money in the lottery as if it were one of their financial investments.

At present, there is no effective retirement pension system specifically designed for informal workforces that proves to be successful in Thailand. This paper intends to strengthen the pension system for informal workforces. The research proposes a solution in which the Thai government transforms the funds allocated for lottery tickets into a pension scheme through the implementation of a voluntary savings program. Under this program, informal workers desiring to convert their lottery expenditures into a pension can achieve this by switching the equivalent amount they would have spent on lottery tickets into a dedicated pension fund.

Objectives

This study aims to introduce the 'Government Savings Lottery Fund for Retirement' to the Thai government, aiming to convert lottery proceeds from the informal sector into long-term retirement savings. Its objectives include identifying suitable characteristics for this financial instrument, assessing its feasibility in supporting retirement, and addressing key aspects of Thailand's aging society, such as labor coverage, retiree income, financial sustainability, capital market improvement, and fiscal responsibility.

Literature Review

The literature review will be divided into two parts. The first will explore the development of converting lottery funds to pensions, addressing the controversy surrounding this approach within the Thai community. We will review the global rationale for lotteries, highlighting that purchasing lottery tickets may not always stem from gambling, and ultimately conclude on the rationale for channeling lottery funds into long-term savings. The second part will focus on informal workers and the challenges associated with implementing a pension system for them.

1. Development of the Concept of Converting Lottery Money to Pension

The motivation behind this study stems from the desire to help the poor save money for spending after their retirement and to alleviate fiscal burdens. The first paper, "Behavior of Lottery Players and the Possibility of Shifting Lottery Money to Long-Term Savings" (Pornpen Vora-Sittha, 2010), examines lottery purchasing habits among low-income individuals in Thailand, conducted in two villages in Thailand by Pornsri Laolert (2006). Findings reveal that 72% of participants spent more on lottery tickets than on savings, with 88.41% of the funds used for lottery tickets are their earned money. This behavior mirrors traditional investment principles who invest for a return, not for fun. From this fact, the idea arises that if the lottery is a form of financial investment for those with low education levels and low incomes, and if the government has good financial management by offering alternative financial instruments with guaranteed returns, this could encourage saving for retirement, potentially alleviating fiscal burden for Thai Government.

To confirm the results, two additional research works were carried out, titled "The Possibility of Reshaping Lottery Money to Long-Term Savings: A Case Study in Bangkok, Thailand" (Pornpen Vora-Sittha, 2014), and "An Evaluation of the Possibility of Reshaping Lottery Money to Long-Term Savings for the Poor in Outer Bangkok, Thailand" (Pornpen Vora-Sittha, 2018). The main objective of the two studies was to examine the savings and investment patterns of the poor to discover possible strategy that can boost savings and provide better support for their post-retirement lifestyles. Results of the surveys show that the lottery is the most popular financial investment among the Thai poor, both in Bangkok and outer Bangkok, and there are few alternatives for them to invest their money with an acceptable return like lotteries. The results confirm that up to 70 percent of lottery buyers' behavior in buying lottery supports raising funds by shifting lottery money to long-term savings. When the Mercer CFA Institute Global Pension Index shows that Thailand has had the world's worst pension system for several years, this study aims to examine the savings and investment patterns of informal workers in Thailand to discover methods that can boost savings and provide better support for their post-retirement lifestyles.

1.1 Rational for Issuing Lottery

The literature on financial access for low-income individuals has focused on microfinance lending rather than innovative investment instruments in terms of savings. The empirical evidence from Bangladesh, India, and South Africa shows that the poor save and manage their portfolios through various financial instruments, mostly in the informal financial sector such as gold coins, jewelry, cash, and animals. In Thailand, the lottery is popular among the poor, but it often leads to further impoverishment. To address a new financial instrument by transforming lottery money into long-term savings for retirement, this section presents reviews to confirm that lotteries can be regarded as investments from their savings not for gambling. The topics to be presented are the rationale of issuing a lottery, the motivation for buying a lottery, and the rationale of mobilizing lottery money for long-term savings.

Organizing from ancient times to fund public projects, Lotteries continue to be used by governments worldwide, including China, Rome, England, and Thailand. However, the practice of selling lottery tickets for government revenue is controversial. Critics argue that lotteries effectively serve as a disguised form of taxation, disproportionately impacting low-income individuals who often allocate a significant portion of their earnings to ticket purchases. This raises pertinent concerns regarding fairness and equity in public finance.

1.2 Motivation in Buying Lottery

Theories in economics like game theory and decision theory describe that lottery ticket purchases are influenced by various factors, including payout size, probability of winning, and individual risk preferences. Early economists like Bernoulli (1738) suggested that the marginal utility of money spent on lotteries may be higher for low-income individuals. The framework fits well with the case of Thailand where Chawanual Kananukul (1999), Jitti Mongkolchai and others (2007), Pornpen Vora-Sittha and Parichat Klingthong (2023) found that the portfolio of the Thai poor includes lottery in a higher proportion than the higher income group. Later theories by Von Neumann and Morgenstern (1947) emphasized unequal increases in marginal utility based on risk preferences. Decision theory further adds that purchasing decisions also consider factors like prize size and chance of winning. Studies show that individuals weigh expected losses against gains, suggesting that buying lottery tickets can be seen as both an investment and a form of gambling. Understanding these motivations is important for proposing financial instruments suited to labor working in the informal sector.

1.3 Rational of Mobilizing Lottery Money to Long-Term Savings

What behind the rationale for mobilizing lottery money into long-term savings stems from the observation that lotteries have been widely used by governments and financial institutions to encourage saving behavior, particularly among those who traditionally spend money on lottery tickets but do not save otherwise. Historically, lotteries were introduced in many countries with noble intentions such as financing education, charity, and infrastructure development. However, over time, they have evolved into instruments that serve as a means to promote saving.

The use of lotteries to encourage long-term savings has been successful in various countries, such as Japan (Minabe, 1975) with the introduction of Lottery-Linked Deposit Accounts (LLDA) during 1960-1975, and Bank Rakyat Indonesia: RI (Morduch, 1999), which successfully increased savings by offering a program named "SIMPEDES," combining slightly higher interest rates with lottery incentives. Governments in countries like England and the United States have issued Lottery Bonds, which function similarly to regular

bonds but include periodic lottery drawing incentives, attracting individuals to save more, etc.[1] These examples highlight the effectiveness of using lotteries as a tool to promote savings, especially among individuals who typically participate in lotteries but do not otherwise save. By leveraging the appeal of lottery prizes, financial institutions, and governments can encourage long-term saving behavior among a broader segment of the population, including those with lower incomes. Thus, there is potential to design financial instruments that harness the power of lotteries to bolster savings among underserved communities.

Lotteries are widely popular among Thailand's low-income population, but they are often seen as contributing to poverty. However, research by Pornpen Vora-Sittha (2008, 2010) views them as a form of investment, suggesting that the government can create new financial instruments that poor people voluntarily use as a tool for saving in retirement.

2. **Pension System for Informal Worker**

   2.1 Thailand's Pension System Ranks Last in Global Pension Index

On October 14th, 2022, Mercer released the 14th edition of the CFA Institute Global Pension Index survey findings. The survey covered 44 locations worldwide, encompassing 66 percent of the global population. Evaluation of each country's pension system is based on three key dimensions: adequacy, sustainability, and integrity. In the survey rankings, Thailand performed the least favorably, securing the 44th position with a D grade and a score of 41.7 out of 100, resulting in an average score of 63.0. Alongside Thailand, other countries that also received a D grade were Argentina, the Philippines, India, and Turkey. Among ASEAN countries, Thailand also ranked poorly within the ASEAN group. Singapore secured the top position, followed by Malaysia, Indonesia, and the Philippines (Mercer, 2022).

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[1] More revision of literature was presented in an article titled 'New Financial Instrument for Thai Urban Poor' in the Journal of NIDA Economic Review, vol. 6, no. 2, 2012, pp. 25-51. https://so06. tci-thaijo.org/index.php/NER/article/view/22713/19414

2.2 The Notion of Employment in the Informal Economy

The informal economy, per the International Labor Organization (ILO, 2004), includes a broad spectrum of workers without social protection, comprising salaried, self-employed individuals, and those in unregistered or informal establishments. It also encompasses workers in formal organizations without social safeguards, as well as those in countries with insufficient social protection and those producing goods solely for household use. Agriculture often plays a significant role in the informal economy, suggesting that providing social protection could facilitate the transition of informal workers to the formal sector.

2.3 Characteristics of Informal Workers in Relation to the Pension System

The ILO (2018) finds that 85% of informal workers globally are employed in small, informal firms, with only 11% in formal firms. Informal employment significantly contributes to production and employment but exposes workers to vulnerability. Informal workers face low and irregular income, making it hard to access social security. The lack of formal contracts and inadequate provisions discourage their participation. However, Vinicius Carvalho Pinheiro (2006) proposed different views that many informal workers are unwilling to join social security funds due to the inadequate provisions provided to informal labor. Formal or informal workers may hold distinct perspectives or attitudes regarding the various risks associated with these benefits.

In Thailand, informal workers, as defined by the National Statistical Office (2019), refer to individuals who lack job security and social protection. They include self-employed individuals, whether with or without employees, or employees without social security or state employee benefits. More than half of Thailand's informal labor force works in the agricultural sector (11 million people), while the rest are engaged in non-agricultural informal work (9 million people). The majority of these individuals work in retail and food service occupations, such as small-scale traders, online retailers, street vendors, and restaurant staff. This group consists of more than percent of individuals over the age of 40, with education levels limited to secondary school or lower, relying only on basic skills for their occupations. Therefore, occupational changes are limited for them.

Due to limited access to social protection systems, informal workers in Thailand face vulnerability due to low and unstable incomes. On average, they earn 6,586 baht per month, significantly less than formal workers who earn over twice as much at 15,502 baht per month. With limited savings and frequent debt issues, they are highly susceptible to unforeseen circumstances such as illness, disability, unemployment, retirement, or the COVID-19 pandemic. Unlike other labor groups, they lack income support or assistance in cutting expenses (Montri Kapilakanjana and Wanmai Nontitipong, 2021).

2.4 The Problem of Establishing a Pension System for Informal Workforce

Policymakers must acknowledge the unique needs of informal workers and develop tailored social security mechanisms to address their challenges.

Despite awareness of the issue, many countries struggle to include informal workers in national pension systems. Statistics reveal limited coverage, such as 34.2% in Asia and 8.7% in the Pacific (Sri Wening Handayani,2019). In Africa, only 10.6% of the working-age population is enrolled in pension programs (Melis Guven,2019). Landis MacKellar (2009) proposed that the savings system for informal workers should be voluntary because they tend to have lower incomes, the ability to save less, and higher discount rates. Therefore, government contributions to certain groups are necessary to encourage or incentivize saving.

2.5 The Pension System in Thailand

Currently, the government offers various long-term savings schemes for the elderly, including mandatory and optional plans tailored to different occupations. Formal sector workers must enroll in the Social Security Fund and the Government Pension Fund (GPF), with additional options such as provident funds and retirement mutual funds, etc.. Informal workers can access schemes like the National Savings Fund (NSF), Social Security Fund under Section 40, Elderly Allowance Program, and other retirement programs like Retirement Mutual Funds (RMF) and pension life insurance.

The National Savings Fund

The National Savings Fund was established to allocate social benefits for self-employed people who are not covered by pension schemes or the social security system, and particularly enhance their awareness to begin saving. The fund is basically generated by two sources: firstly,

each member is required to contribute money into the fund with at least 50 baht per month, but not exceeding 13,200 baht in a tax year. Secondly, the government will support this project by investing a budget that will depend on the age of the members. The members will receive their savings and part of their interests as part of their pension when they turn 60 years old. In addition, the individual can claim the amount of annual invested money by using the actual amount to reduce taxable income in a process of the personal income tax computation (NFS, 2023).

The Social Security Fund Under Section 40

Under Section 40 of the Insurance Act, there are three options for voluntary contributions. The options are monthly contributions of 70-baht, 100- baht, and 300- baht. These contributions provide benefits in five cases: 1) accidents or illness, 2) disabilities, 3) death, 4) old age, and 5) child support. Each option provides different levels of benefits, with higher contributions resulting in greater benefits.

At age 60, individuals insured under Section 40 will not receive a monthly pension. Instead, they will get a one-time gratuity based on chosen options. Option 1 offers no gratuity. Option 2 involves government-contributed monthly savings of 50 baht, yielding around 25,000 baht at 60. Option 3 offers enhanced benefits with government savings of 150 baht monthly, resulting in approximately 87,000 baht at age 60. Both options allow additional monthly savings of up to 1,000 baht.

Currently, government-backed long-term savings programs for informal sector workers, namely the National Savings Fund (NSF) and Social Security Fund under Section 40, have seen limited success, covering only 27.45% of informal workers nationwide, leaving a significant portion without pension coverage.

The Elderly Allowance Program

The Elderly Allowance, part of government social welfare, supports citizens over 60 not covered by other pensions. Monthly pensions range from 600 to 1,000 baht, based on age: 60-69 years get 600 baht, 70-79 years get 700 baht, 80-89 years get 800 baht, and those 90 and above get 1,000 baht. Excludes civil servants.

Other Retirement Funds

Numerous private and community-based long-term savings options, like Retirement Mutual Funds (RMF) and pension life insurance, are accessible to informal workers who can voluntarily enroll as members.

Suwanrada (2020) found 88% of elderly in Thailand receive civil servant pensions and allowances, indicating broad income protection. However, Vora-Sittha and Klingthong (2021) revealed most informal workers that covered by NSF and Social Security Fund Section 40 lack sufficient benefits for stable old age. Various sectors, including government agencies, members of the House of Representatives, and the public, are exploring solutions to address this issue.

The 2021 Informal Worker Survey by Thailand's National Statistical Office found that many workers frequently move between formal and informal employment or between government and private sectors. This shifting results in insufficient contribution periods in each sector, leading to limited pension benefits, often just a gratuity. These inadequate benefits may fail to offer necessary financial support over their lifetimes.

To address this issue, Thailand should strive to design a pension system that accommodates the diverse working styles of its workforce. One potential approach could involve establishing greater interconnectivity between various subsystems, allowing for a more seamless transition for workers. Furthermore, creating higher incentives for voluntary savings systems could be considered as part of the reform efforts (Bank of Thailand, 2021).

Conceptual Framework

Theoretically, several renowned economists, including John Maynard Keynes, Milton Friedman, and James Tobin, advocated for categorizing household spending into everyday expenses, emergency funds, and investments in financial instruments such as bonds, common stocks, private debentures, gold, and land. According to financial theory, the funds allocated to acquire these financial instruments are commonly referred to as financial investments".

Each type of financial investment carries a varying degree of risk, which directly impacts the likelihood of receiving anticipated returns. In the context of Thailand, the least risky financial investments, in terms of potential return, include depositing money in a commercial bank and purchasing government bonds, debentures, preferred stocks, common stocks, and derivatives. Conversely, spending money on instruments with a significantly high risk of principal loss, such as lottery tickets, is generally not considered a financial instrument within the scope of financial investment theory.

Despite this general perception, lottery tickets have gained immense popularity among individuals in Thailand, particularly those in the informal sector. Previous studies confirm that the motivation behind purchasing lottery tickets is seen as a form of financial investment rather than an addiction to gambling. Consequently, if the act of buying lottery tickets were to be recognized as a type of financial investment in Thai society, and if the Thai government were to allocate a portion of the lottery funds such as dealer's profit towards a pension program, it would create a voluntary savings initiative for informal workers in Thailand. Concept of transforming lottery money into lifelong monthly pension payment after retirement is presented in Figure 1.
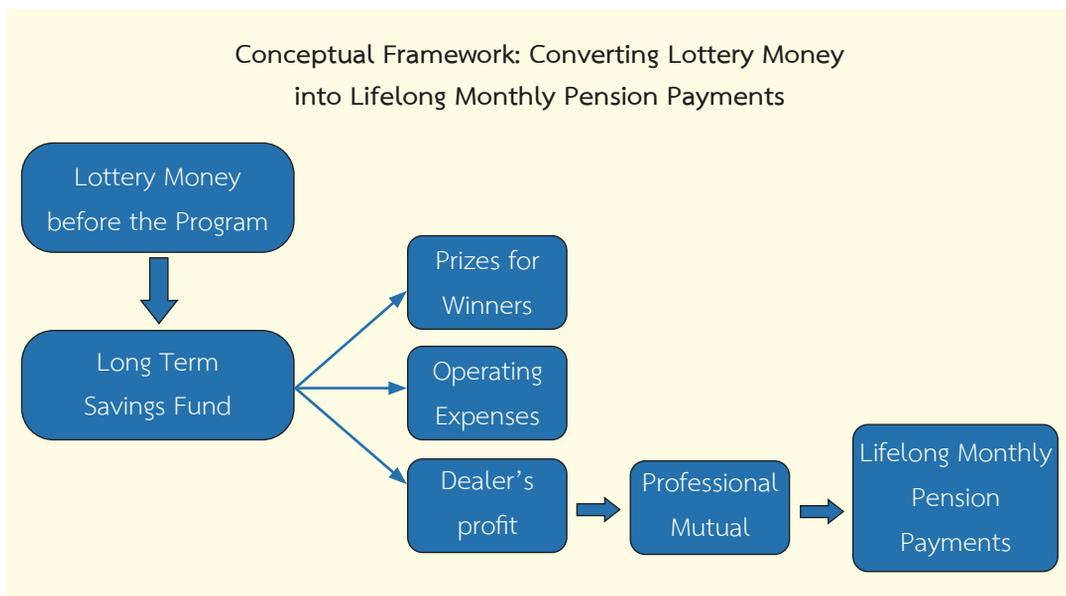
Figure 1 Conceptual Framework: Converting Lottery Money into Lifelong Monthly Pension Payments

The success of the program hinges on three hypotheses that need to be validated. They are: Is the number of informal workers capable of participating in the program until their retirement large enough to establish a national long-term savings program? Is the amount of money that the target group spends on buying lottery tickets worth the intention to establish a national long-term savings fund? And finally, do the proceeds from the fund satisfy five key aspects of establishing the new pension system.

Methodology

This study employs document and survey research methods to analyze the behavior of savings and buying lotteries in Thailand. Resources include academic publications, information, news about saving behavior, and related topics from website articles and research. For the survey, direct interviews were conducted with a sample of 2,600 individuals in the Muang District of 13 provinces using a multi-stage sampling method between February and May of 2022. The target sample consists of Thai informal workers aged over 17 years old, working in the following occupations: (1) freelancers, (2) vendors/online product sellers, (3) business owners, (4) employees/permanent workers in small business, (5) temporary employees, (6) service drivers, and (7) farmers. The questionnaire comprises three parts: savings and lottery behavior, confidence in lottery ticket purchases, and general respondent information.

The analysis comprises four main sections. The first section primarily examines the savings and lottery purchasing behaviors of individuals in Thailand, with the objective of illustrating the lottery's popularity as a financial investment tool among informal workers. The data collected for this study underwent processing through SPSS and STATA software, and descriptive statistical techniques were employed for examination.

In Section 2, we will project the number of individuals in the target group who are informal workers and analyze their purchasing behavior of lottery tickets as an indicator of their potential engagement in the program until their retirement. Additionally, we will estimate the size of the fund to verify the hypothesis regarding the justification of establishing a national long-term savings fund based on the amount of money spent by the target group on purchasing lottery tickets. The following variables will be computed:

1) The number of informal workers meeting all three criteria for lottery participation: regularity in purchasing lottery tickets, a specific purpose for buying them, and utilizing a specific source of income to purchase the tickets.

2) The average amount of money spent on lottery tickets per individual among informal workers.

3) The estimated size of the Retirement Pension Fund associated with this program.

Section 3 is dedicated to estimating the expected pension amount in the future, aiming to determine if the fund's proceeds fulfill five essential criteria for establishing the new pension system. To accomplish this, the study utilized the Future Value of an Annuity formula (Brigham, 1980) in the following model:

Sn = R [FVIFAk, n]

Where:

Sn: Future Value of an Annuity

FVIFAk, n: Future Value Interest Factor for an Annuity R: Fixed Annual Revenue

k: Rates of expected return n: Number of years

In this section, we present the factors that determine the level of pension variables, and estimate the monthly pension amount received by individuals.

Results

The study findings are organized into three sections: the first section provides the survey results, the second section presents the model estimation using data from the survey, and finally, recommendations are offered for aligning the key features of the new financial tool.

1. The Survey Results

1.1 General Information of Interview Respondents

The respondents represented informal workers from seven different occupations mentioned in the part of methodology. Regarding age, their ages ranged from 17 years to 89 years, with the greatest age range being 30-50 years. Concerning the highest level of education, the majority had education lower than high school at 46.4%, followed by a bachelor's degree, a vocational certificate/diploma/associate degree, and a postgraduate degree respectively. In terms of income level, the majority (71.93%) earned an average monthly income of less than 20,000 baht, with 13.03% reporting no savings. Among those who did have savings, 65.27% had less than 5,000 baht per month saved (Table 1). Overall, 83.73 percent of respondents were interested in having money to spend on the elderly (Pornpen Vora-Sittha and Parichat Klingthong (2021).

Table 1: Summary of Survey Data

Description		Number of Observations	Percent
Age	<=30	502	19.0
	31 - 50	1577	59.7
	51 - 60	402	15.2
	61 - 89	159	6.0
Education	lower than high school or equivalent	1,226	46.4
	vocational certificate/diploma	559	21.2
	bachelor's degree	762	28.9
	postgraduate	93	3.5
Income	<= 15,000 baht	1,000	37.9
	15,001 - 20,000 baht	899	34.1
	20,001 - 30,000 baht	399	15.1
	> 30,000 baht	342	13.0
Savings	no savings	344	13.03
	<= 5000	1,723	65.27
	5,001-10,000 baht	347	13.14
	> 10,000 baht	226	8.56
Total Observation		2,640	100.0

1.2 How do informal laborers spend money for savings?

Regarding their management of savings and investments, the survey reveals that individuals have approximately nine different forms to handle in their portfolios, as shown in Table 1. The survey participants possess a diverse range of financial instruments within their investment portfolios. The results confirm that the lottery is the most popular investment choice for those working in the informal sector. About 76.4 percent of the respondents allocate their money towards lottery tickets, either in the government lottery or the illegal lottery. Their preference for lotteries may be due to the perception that the formal financial sector is overly rigid and provides fewer appealing returns compared to lottery winnings.

The informal financial sector investment options in portfolios, as presented in Table 2, indicate the inflexibility of informal workers to put their savings into formal financial institutions. This finding is consistent with McKinnon's (1973) research, which states that individuals who face limitations in saving money through specific tools tend to turn to other methods, despite the increased risk. The finding supports the aim of this research in proposing a strategy for providing informal sector workers with access to formal savings tools that are less risky than buying lottery tickets and guarantee a higher return on investment.

Table 2: Portfolio of the Respondents in the informal sector (%)

Investment Portfolio	% of Respondents
Cash/deposit	76.4
Lending	4.1
Lottery tickets both legal and illegal	76.4
Illegal rotating savings	12.8
Gold	14
Government savings lotteries	10
Legal community savings units (1)	9.3
Mutual funds	4.8
Others (2)	1.6

Note: (1) The legal community savings units comprise various entities such as the Social Security Private Fund for Social Welfare (SFW), Savings Cooperative, Community Bank, and Credit Union, etc. (2) Others include endowment insurance, investment in business, and cryptocurrency.

1.3 Desire to Purchase Lottery Tickets

Upon inquiring about their desire for purchasing lottery tickets, 75.00 percent of the respondents stated that their primary motivation was winning the prize. The survey results indicate that most participants perceive buying lottery tickets as an investment rather than as gambling. Other motivations identified in the survey include purchasing for entertainment, being attracted to the game, finding the process easy, or simply having a habit of buying tickets regularly. The results show that respondents prioritize purchasing lottery tickets over other alternatives (Table 3).

Table 3: Reasons to Buy Lottery

Reasons to Buy Lottery	Lottery Buyers (%)
To win prize	75.00
Just for fun/ want to bet	12.65
Following attractions and easy to buy	24.17
Habits	9.58

2. Analysis of the Model Estimation

The study findings are organized into three sections. Firstly, we use the survey results to evaluate the promptness of the respondents for being members of the long-term savings program. Secondly, we assess the feasibility of the proposed retirement program from the lottery proceeds by estimating the possible size of the Long-Term Savings Fund using the Future Value of an Annuity simulation model. Lastly, projections for the pension amounts each member can anticipate receiving from the Government Savings Retirement Lottery Fund post-retirement are provided.

2.1 Promptness of the Respondents for Long-Term Savings Program

The readiness of lottery buyers to participate in the new financial instrument is a crucial factor for the success of mobilizing their lottery money to long-term savings. In this part, we use the survey results to analyze the respondents' promptness in joining the long-term savings program until their retirement, with the hope to reduce the possibility of quitting halfway. This study uses three indicators to measure their capability in participating in the program until their retirement, namely (1) the regularity of buying a lottery (2) the purpose of buying a lottery, and (3) the source of money used to buy a lottery. The three indicators derive from the concept of Retirement Mutual Funds. Table 3 displays the possible choices of three indicators.

Table 4: Options for Evaluating Promptness Indicators

Motivation in Buying Lottery	Regularity in Buying Lottery	Source of Money
- To win a prize	- Every month	- Earned income
- Just for fun/ want to bet	- Every quarter	- Rewards from the Previous
- Following attractions	- At least once a year	- Purchase
- Easy to buy	- Uncertain	- Loan
- Habits	- Never buy lottery	- Self-savings or relative's savings

Table 4 presents the data on the proportion of participants whose purchasing behavior aligns with the three predetermined criteria employed in this investigation. The findings reveal encouraging indications that a significant majority, reaching as high as 75.05 percent, of individuals who engage in lottery purchases meet all three specified indicators. These findings support the initial hypothesis that there exists a significant number of informal workers capable of enrolling in the program until their retirement, thus enabling the establishment of a nationwide long-term savings program with broader labor coverage.

Table 5: Proportion of Survey Participants Meeting Three Criteria for Lottery-Style Purchases

Promptness Indicator	Choice of Selection	% of Respondents Buying Lottery
Regularity in buying lottery	At least 1 transaction a year	96.65
Motivation in buying lottery	To win prize	75.0
Source of Money Spent in Lottery	Earned income and the former prize money	73.0
The Percentage that Meets All Three Criteria		75.05

2.2 An Analysis of the Possible Size of the Long-Term Savings Fund

This section evaluates whether the amount of money that the target group spends on buying lottery tickets is worth the intention to establish a national long-term savings fund. The presentation is divided into three parts. The first part demonstrates how to derive variables used in the simulation model. The second part presents the guidelines that establish the proportion of a lottery purchase to be allocated to long-term savings. The last part estimates the possible size of the long-term savings fund.

2.2.1 The Variables

To estimate the fund size of long-term savings in the simulation model, three variables play a crucial role. These variables are (a) the average expenditure on lottery purchases made by the target group. (b) the number of members who will join the program. (c) the number of years during which a significant portion of the informal target group can participate in the program. By considering these three variables, it becomes possible to estimate the fund size of long-term savings within the simulation model.

a. The Average Expenditure on Lottery Purchases

Table 5 illustrates the expenditure on lottery ticket purchases made by the target group, classified by the amount spent on lottery purchases per person per year. By conducting statistical analysis on the sample data, we found that the average annual expenditure on lottery tickets was estimated to be 6,982.71 baht. Here is the formula for calculation:

Average = Σ f	=	17,317,131.50	=	6,982.71
Σ f X				2, 480

Table 6: Assessment of Average Amount of Lottery Purchases of the Target Group

Lottery Money in baht	Mid-Point (X)	Frequency (f)	fX	% of buyer	Accumulative Frequency
1-1,000	500.5	449	224,725	18.10	18.1
1,001-2,000	1,500.5	515	772,758	20.77	38.87
2,001-4,000	3,000.5	523	1,569,262	21.09	59.96
4,001-6,000	5,000.5	388	1,940,194	15.65	75.60
6,001-8,000	7,000.5	178	1,246,089	7.18	82.78
8,001-10,000	9,000.5	121	1,089,061	4.88	87.66
10,001-30000	20,000.0	217	4,340,000	8.75	96.41
30001-60000	45,000.5	57	2,565,029	2.30	98.71
60001-90000	75,000.5	13	975,007	0.52	99.23
90001-120000	105,000.5	11	1,155,006	0.44	99.68
120001-240000	180,000.5	8	1,440,004	0.32	100.00
Total		2,480	17,317,132	100.00	
Average money used to buy lottery ticket per head per year		6,982.71			

b. The Number of Members Joining the Program

Based on data from the National Statistical Office of Thailand, it was reported that the total count of informal workers in 2021 stood at 19.6 million individuals. To qualify for the long-term savings program, respondents must fulfill three specific criteria: (1) regularity in purchasing lottery tickets, (2) a defined purpose behind buying these tickets, and a known source of funds for this expenditure. Table 3 illustrates that approximately 75.05 percent of informal workers meet these three criteria. Consequently, it can be estimated that around 14.7 million informal workers are prepared to partake in the project.

C. The Number of years joining the program

The amount of money each participant can save in the retirement fund depends on the duration of their participation in the project. To estimate the possible investment period, we use the number of years each participant starts buying lottery tickets and then estimate the duration until they reach 60 years old. The study reveals that 77.9 percent of lottery buyers have investment periods ranging from 21 to 40 years, as depicted in Table 6.

Table 7: An Estimation of the Investment Period in the Fund of Each Pers

Number of Years of Purchase (Year)	Number of Samples	Percent
more than 40	243	9.20
31-40	1,371	51.93
21-30	686	25.98
11-20	152	5.76
Less than 10	28	1.06
do not buy any lottery	160	6.10
Total	2,640	100.00

The preceding presentation leads us to the conclusion concerning the variables' significance in estimating the fund size of long-term savings in the simulation model, as depicted in Table 7.

Table 8: Summary of Variables for Fund Size Estimation

Number of informal workers in Thailand (2021)	19.6	million
The ratio of informal workers with 3 criteria*	75.05	%
Number of informal workers with promptness to join the program (75.05 percent of total informal workers)	14.7	million
The average lottery purchase /person/year	6,983	baht
Duration of investment in the fund of each person	20-40	years

Note: * Refers to informal workers aged 18 years and over who buy lottery tickets regularly with the expected return as the main goal and use personal money to buy.

2.2.2 Guidelines for Determining the Proportion of Lottery Purchases Allocated to Long-Term Savings.

Buying lottery tickets is the riskiest financial instrument, the buyer will lose the principal if they do not win the prize. To calculate the potential size of the long-term savings fund, the criteria for evaluating the amount of money that can be allocated to long-term savings are as follows:

a. The lottery money is divided into three parts: prizes for winners, operating expenses, and the remaining money, which typically represents the dealer's profit. The third part of this money is the amount that can be converted into savings. To convert lottery funds into long-term savings, the government should establish a long-term savings fund and entrust professional mutual funds with managing the funds for investment in the formal financial sector, such as bonds, equity, and other financial instruments. The objective is to generate returns and provide pension benefits to the members once they reach the age of 60.

b. To evaluate the profits received by lottery dealers in Thailand, the information used is from two main agents that sell lottery: the Government Lottery Office and illegal lottery dealers, as follows:

Government Lottery Office: The Government Lottery Office has set a criterion for dividing income from selling the lottery into three parts: 60 percent is allocated for prizes, 17 percent is for administrative expenses, and the remaining 23 percent is remitted to the state revenue.

Illegal Lottery Agent: The distribution of illegal lottery tickets occurs in both wholesale and retail forms, similar to the government lottery. Based on research reviews and in-depth interviews, we assess the profit of illegal lottery dealers to be in the range of 20-30 percent of the amount purchased. To ensure that this profit is within acceptable limits, this research compares the profits from selling Digits Lottery in Thailand from 2004 to 2006.[2] It was found that the profit ratio ranged between 17 to 29 percent.[3]

To evaluate pension funds using lottery revenue, this research was based on the criteria of the above lottery distributors by dividing the revenue from lottery sales into three parts: prize money, administrative expenses, and profits. The money allocated for the long-term savings fund is the remainder of the proceeds from the sale of lottery tickets after paying out winnings and covering operating costs. In determining the retirement benefits received by individual members, the amount of money contributed to the fund is determined by the assumptions made in each scenario. The higher the percentage of money allocated to the fund, the greater the retirement benefits received by individual members. This research has established four scenarios by assigning proportions of lottery money to the fund: 20%, 40%, 50%, and 70%, as presented in Table 8.

Table 9: Scenarios for Determining the Ratio of Expenses and Rewards for New Instruments.

Receipt of the Lottery Money	Scenario 1	Scenario 2	Scenario 3	Scenario 4
prize	60%	50%	40%	20%
operating cost	20%	10%	10%	10%
Profit from the sales	20%	40%	50%	70%
total	100%	100%	100%	100%

c. To compute the possible size of the long-term savings fund, this research uses the four scenarios to simulate 4 alternative choices. We calculate the amount of money expected to increase if lottery buyers will get the principal back in 4 periods: 10 years, 20 years, 30 years, and 40 years by using the Future Valuation Model (FVIFA). Assumptions for evaluating the possibility of lottery money being converted into pensions are

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[2] 1 Digits Lottery is a special lottery with the last 3 digits and 2 digits issued by the Government Lottery Office during 2003-2007 with the objective of solving problems of illegal lottery.

[3] Detail of the study is elaborated in Pornpen Vora-Sittha and Parichat Klingthong (2023), Table 4.2

c.1 Expected returns from long-term investments are set at 3 rates: 1, 3, and 5 percent per year.

c.2 Evaluating fund size by assuming that there is an additional purchase of savings lottery every year starting with the amount of 6,983 baht per person until the age of 60. The pension payment period is set at the age of 60 in 4 periods: 10 years, 20 years, 30 years. and 40 years. Table 9 displays results, showing 14.7 million projected program participants from Table 7. Assuming each contributes an average of 6,983 baht annually to the savings lottery until retirement. With rising income, individuals may increase lottery spending, leading to higher fund accumulation.

Table 10: An Estimation of the Fund Size of the Government Savings Retirement Lottery Fund for Informal Workers

Number of Members			14.7			millions
Average investment in savings lottery/person/year			6,983			baht
investment period	rate of return per year	multiplier*	Assumption 1	Assumption 2	Assumption 3	Assumption 4
Proportion in the Savings Lottery Fund			20%	40%	50%	70%
Average investment in the fund/person/year (baht)			1,397	2,793	3,491	4,888
Total investment in the fund per year (million baht)			20,529	28,741	51,323	71,852
Estimated fund size based on an annual rate of return on investment (million baht)						
10 years	1%	10.462	214,776	429,552	536,940	751,717
	3%	11.463	235,326	470,652	588,315	823,640
	5%	12.577	258,195	516,391	645,488	903,684
20 years	1%	22.019	452,032	904,063	1,130,079	1,582,111
	3%	26.87	551,619	1,103,237	1,379,047	1,930,666
	5%	33.066	678,817	1,357,635	1,697,044	2,375,861
30 years	1%	34.784	714,087	1,428,173	1,785,216	2,499,303
	3%	47.575	976,675	1,953,350	2,441,688	3,418,363
	5%	66.438	1,363,917	2,727,834	3,409,792	4,773,709
40 years	1%	48.886	1,003,589	2,007,178	2,508,972	3,512,561
	3%	75.401	1,547,920	3,095,840	3,869,799	5,417,719
	5%	120.79	2,479,718	4,959,436	6,199,295	8,679,013

Note: * Derived from Future value interest factor of an (ordinary) annuity of $1 per period at i % for a period (FVIFAi, n)

In the first scenario, with a 20% contribution from sales, the average yearly contribution per person is 1,397 baht, totaling 20,529 million baht annually. Over 10 years, the fund could reach between 214,776 million and 258,195 million baht, depending on investment returns of 1%, 3%, or 5%. By the 40th year, assuming 14.7 million members and the same contribution rate, the fund could grow to between 1.00 trillion and 2.48 trillion baht.

Similarly, in scenario 2, setting aside 40% of the profit will make the fund about 1.45 times larger than in scenario 1. With an average annual return of 1-5%, the fund could reach 2.0-4.96 trillion baht in the 40th year. In scenarios 3 and 4, transferring lottery money to the fund up to 50% and 70% respectively, could result in fund sizes of 2.51-6.20 trillion baht and 3.51-8.68 trillion baht in the 40th year.

The analysis suggests that the proposed fund is expected to have substantial resources for its establishment, reinforcing the notion that creating a national long-term savings fund is worthwhile, supporting the second hypothesis. Conservative estimates indicate the fund could reach around 20,529 million baht when the entire target group participates fully, doubling the current National Savings Fund's balance of 10,956.94 million baht as of May 2023.

2.3 Pension projections from the Government Savings Retirement Lottery Fund.

This section projects the amount of pension received from the government savings retirement lottery fund for each member. The study is divided into three parts. Firstly, we will introduce the factors that determine the level of pension in our model. In the second part, we will estimate the income level for retirement that is considered an adequate amount. Finally, we will present two case studies to evaluate whether the lottery money that lottery buyers switch from the lottery market to the Fund is sufficient for retirees.

2.3.1 Factors Determining the Level of Pension

The level of pension that members receive is determined by several factors, including the purchase amount of the savings lottery, the member's period of participation, and the rate of return achieved from managing the fund.

a. Purchase Amount of the Savings Lottery

This assumes that the savings lottery is designed to provide a return on investment based on the amount of funds contributed. Therefore, the level of pension depends on the amount of money an individual invests in the savings lottery.

b. Member Period

The member period refers to the length of time an individual is an active participant in the pension scheme. In this case, the longer someone contributes to the pension fund, the higher their potential pension amount will be. This is because their contributions have more time to accumulate and generate returns, increasing the overall value of their pension fund.

c. Rate of Return from Managing the Fund

The rate of return from managing the pension fund refers to the performance of the investments made by the fund managers. This case assumes that the pension fund is invested in various assets such as stocks, bonds, and real estate, and the return on these investments will impact the level of pension received by the members. A higher rate of return will result in a larger pension amount, while a lower rate of return will lead to a smaller pension.

It is important to note that these cases are generalizations, and that the actual calculation of pension amounts can be complex, involving various factors such as inflation, retirement age, annuity options, and government regulations. Additionally, pension schemes can vary significantly between different countries and organizations, so the specific rules and parameters of the pension plan in question will ultimately determine the level of pension that members receive.

Presumably, benefits paid by the Government Savings Retirement Lottery Fund for informal workers will be in the form of pensions, similar to the National Savings Fund (NSF). Each member will have a personal accounting system with independent capital management. Pension payments are made to retirees at 60 years of age. The formula for calculating pension is based on the formula for calculating pensions of the NSF as follows:

Monthly Pension =

$$\frac{\frac{\textit{Total savings in an individual account}}{\textit{Number of year used to calculate pension}} * \frac{(1+\textit{Estimated net benefit rate})^{\textit{Number of year used to calculate pension}}-1}{\textit{Estimated net benefit rate}}}{\textit{Number of month used to calculate pension}}$$

In the usual practice, members are given the freedom to choose one of the two options for receiving their pension payments: either as monthly benefits throughout their lifetime or as a lump sum. The introduction of a new pension system for Thailand's aging society in this study is motivated by several objectives. They include: (1) expanding the coverage of the labor force, (2) raising income for retirees, (3) ensuring long-term financial stability, (4) enhancing the performance of the capital market, and (5) avoiding becoming a financial burden. To meet these goals, the focus of this study is solely on analyzing the effectiveness of monthly pension payments. Choosing to provide the pension as a lump sum at the age of 60 may not effectively address the challenges of ensuring long-term financial stability and avoiding placing a burden on public finances for pension scheme members.

2.3.2 Projections of the Income Level for Retirement

a. Establishing Monthly Retirement Income.

In designing the appropriate monthly retirement income for the retiree, various approaches exist for determining the ideal income level during retirement. This study examines two specific options. The first method uses the poverty line established by the National Economic and Social Development Council (NESDC) as a reference point. The second approach suggests an acceptable income level proposed by the Asian Development Bank (ADB).

In 2022, the NESDC set the poverty line at 2,802 baht per person per month, a significant increase from 2010's 1,586 baht. Using a yearly increment of 101 baht, the projected poverty line income for the next 20 years is 3,815 baht per person per month. Projections suggest 4,829 and 5,842 baht per person per month for the subsequent 30 and 40 years, respectively. Table 10 summarizes these projections, referencing 2012.

Alternatively, another frequently used method for predicting the proxy of the poverty line income in the next decade is through percentage changes. However, this often results in an estimated income level that is excessively high. In this study, a conservative approach is taken, assuming a yearly increase of 101 baht for the poverty line income. This method is selected for its lower target value, prioritizing caution.

Table 11: Estimation of Poverty Line Income

	Estimated poverty line income	Old age allowance paid*	Estimated Adequate income level
2012	1,586		
2022	2,802		
20-year period	3,815	800	3,015
30-year period	4,829	800	4,029
40-year period	5,842	800	5,042

Note: assumption made by researchers based on information provided by the World Economic Forum (2023).

The Asian Development Bank proposes defining an adequate income level as half of an individual's pre-retirement income. Analyzing data from the 2020 informal labor survey by the National Statistical Office reveals that informal workers earn an average monthly income of 6,853 baht. If these workers retire at 60 this year, their retirement income would be 3,426 baht, meeting the 50% threshold. However, this amount is expected to more than double over the next 20-40 years, making it unfeasibly high to reach the desired retirement income.

To evaluate the adequacy of retirement income, this study utilizes the income level set at the poverty line as a reference point. This benchmark is chosen due to its relatively lower value that needs to be met. Nevertheless, it is important to acknowledge that attaining the ADB's suggested amount of 3,426 baht may pose a challenge for numerous individuals.

At this point, we summarize that the recommended target for a monthly retirement income is 3,815 baht per person for the first 20 years after establishing the Fund, increasing to 4,829 baht for the subsequent 40 years. Factoring in the old-age allowance for individuals aged 60 and above in Thailand, ranging from 600 to 1,000 baht per month, this helps raise the member's monthly income. Projections from the World Economic Forum (2023) indicate that the average age of Thai citizens will exceed 80 by 2050, aligning with the 800 baht per month allowance presently. Consequently, the estimated monthly pension from the Fund, including these allowances, is around 3,000 baht for the initial 20 years and approximately 5,000 baht for the following 30 to 40-year period.

b. The Projections of Monthly Pension Payments: A Case Study

Monthly pension estimations rely on investment assumptions. This study presents two case studies: Case 1 assumes an annual lottery ticket expense of 6,983 baht per person, which is the survey's average. In contrast, Case 2 calculates the investment needed for a pension exceeding 5,000 baht per person, deemed sufficient for retirement in the next 30 to 40-year period. It is important to note that, in practice, each member will receive a monthly pension throughout their lifetime, the amount varying depending on the money they invest in lottery tickets until the age of 60.

Case 1: Projected Pension with Annual Investment of 6,983 Baht

In Scenario 1 spending 6,983 baht annually on lottery tickets over 10 years with a 5% return on investment and 20% of the prizes kept in the fund yields an estimated monthly pension of 89 baht. In Scenario 4, where 70% of lottery purchases are retained for long-term savings, the projected monthly pension rises to 311 baht. For a 40-year membership period, the estimated monthly pension reaches 2,989 baht (Table 11).

Comparing the four scenarios, Scenario 4 stands out with the highest monthly income, making it the most financially rewarding. However, the chance of winning a prize is the lowest, which is not strong enough to justify program participation despite the potential for the highest post-retirement earnings. Scenario 3 appears most favorable, offering a 50% deduction on lottery ticket expenses with a winning probability close to that of the Government lottery."

Let us consider Scenario 3 in the moderate situation: a 30-year investment at a 3% rate of return is expected to yield a monthly income of 841 baht. When combined with the old age allowance of 600 baht per month, the total monthly income reaches 1,441 baht. However, this falls short of the recommended monthly pension of 4,029 baht for a quality of life above the poverty line as presented in Table 10. Therefore, individuals have to participate in the NSF fund to bridge this income gap.

Table 12: Forecasting Retirement Benefits: Projected Pension with Annual Investment of 6,983 Baht

Average investment in savings lottery/person/year= 6,983 baht		Scenario 1	Scenario 2	Scenario 3	Scenario 4
Proportion in the Savings Lottery Fund		20%	40%	50%	70%
Average investment in the fund/ person/year (baht)		1,397	2,793	3,491	4,888
Investment Period	Rate of returns	Amount of Pension/person/month (baht)			
10 years	1%	74	148	185	259
	3%	81	162	203	284
	5%	89	178	222	311
20 years	1%	156	311	389	545
	3%	190	380	475	665
	5%	234	468	584	818
30 years	1%	246	492	615	861
	3%	336	673	841	1,177
	5%	470	939	1,174	1,644
40 years	1%	346	691	864	1,210
	3%	533	1,066	1,333	1,866
	5%	854	1,708	2,135	2,989

Case 2: Projected Purchase in Savings Lottery to Secure a Monthly Pension of 5,000 Baht

In Case 2, it demonstrates the scenario in which the members of the Fund require a target pension rate of 5,000 baht per month to ensure a quality of life above the poverty line after retirement. Table 11 presents the necessary annual or monthly purchase amounts based on different assumptions regarding rates of return, ranging from 1 to 5 percent.

In order to attain this monthly pension in Scenario 3, where 50 percent of the money is allocated to a savings fund, individuals would need to make an annual purchase of 59,745 - 89,719 baht, or a monthly purchase of 4,978 - 7,476 baht per person for a duration of 20 years.

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[3] Explanation of NSF is in page 6

Alternatively, following Scenario 4, where 70 percent of the money is invested in the fund, the buyer must make an annual purchase of 42,675 - 64,085 baht, or a monthly purchase of 3,556 - 5,340 baht per person for a 20-year period.

Based on the given information, Scenario 3 appears to be the most likely outcome for a 5,000-baht monthly pension. This scenario assumes a 30-year investment period with an annual return of 3%. To achieve this pension, investors would need to regularly invest in a savings lottery with an annual cost of 41,524 baht or a monthly cost of 3,460 baht until the age of 60. Please note that these calculations are based on the provided excerpt, and there could be other factors or details that might influence the overall calculation.

Table 13: An Estimates Amount of Purchase Savings Lottery to Secure a Monthly Pension of 5,000 Baht

Estimates Amount of Purchase to Secure a Monthly Pension of 5,000 Baht"		Scenario 1	Scenario 2	Scenario 3	Scenario 4
Proportion in the Savings Lottery Fund		20%	40%	50%	70%
Investment Period	Rate of returns	Amount of Pension/person/month (baht)			
	1%	224,297	112,149	89,719	64,085
20 years	3%	183,804	91,902	73,521	52,515
	5%	149,362	74,681	59,745	42,675
	1%	141,985	70,992	56,794	40,568
30 years	3%	103,811	51,905	41,524	29,660
	5%	74,337	37,169	29,735	21,239
	1%	101,027	50,514	40,411	28,865
40 years	3%	65,501	32,750	26,200	18,715
	5%	40,888	20,444	16,355	11,683

The study's findings indicate that individuals who shift their spending habits from purchasing lottery tickets to long-term savings will observe a rise in their monthly income over their lifetime. This increase ultimately contributes to sustained financial stability without placing any additional strain on the government's finances. Consequently, based on the aforementioned analysis, it can be concluded that the proceeds generated from the fund effectively fulfill five fundamental aspects necessary for establishing a new pension system. These aspects include: a) Promoting broader labor coverage, b) Enhancing income levels for retirees, c) Ensuring long-term financial stability, d) Enhancing the performance of the capital market, and e) Preventing the system from becoming a fiscal burden. Thus, the results obtained from the study provide support for hypothesis 3 as proposed in this research.

3. Recommendation of the Key Features of a New Financial Tool

According to this study, it is recommended that the Thai government develop well-defined strategies to introduce a novel financial instrument in the form of lottery saving ticket that caters to the needs and preferences of the informal workforce. It is crucial for this tool to adhere to existing laws and regulations. The aim is to redirect funds that would otherwise be spent on lottery tickets towards retirement savings through the provision of this option. The key features of a new financial tool that are expected to motivate the switch in funds are as follows:

In establishing a 'Government Savings Lottery Fund for Retirement' for the informal workforce, membership should be voluntary, and formal workers should also be given the opportunity to participate. The Fund should be self-sustaining, with no required contributions from the government. The results from the survey show a significant majority of respondents, with 83.73 percent expressing their intention to save for retirement.

To incentivize lottery buyers to become members of the Fund, the lottery saving ticket should offer the option to choose their favorite number, similar to buying a government lottery. Otherwise, potential participation may decrease by at least 30.34 percent.

It is recommended to choose the winning number that matches the government lottery. Similarly, the chances of winning and the frequency of winnings should align with the standards set by the government lottery since it is familiar to the participants.

To guarantee a steady income for members after their retirement, the proceeds generated from the sale of the financial instrument should be invested in a professionally managed fund. These funds can then be gradually disbursed as lifetime retirement benefits once individuals reach the age of 60.

In order to successfully motivate the informal workforces to participate in the program, it is recommended that the prize money be set at a minimum of 50 to 60 percent of the total sales. Research findings reveal that approximately 50 percent of individuals who buy lottery tickets prioritize winning a prize over the potential loss of initial investment.

Retirement fund allocations should factor in lottery savings ticket expenditures and investment returns. To ensure equitable distribution, it is recommended to implement a cash refund annuity system. Suppose a member passes away before receiving benefits equivalent to the principal. In that case, the remaining amount should be passed to their heirs, similar to an inheritance, acknowledging Thais' strong sense of familial responsibility, and some individuals use the funds received from their children to purchase lottery tickets.

To ensure fairness and minimize the impact on the sales of the Government Lottery Office, it is recommended to restrict lottery savings ticket purchases by setting a maximum monthly pension, thereby evenly distributing tickets.

To foster membership growth and help during emergencies, it is advisable to grant eligible members who have maintained a minimum duration of membership the option to borrow money at a reduced interest rate compared to prevailing market rates. This policy aims to reduce dependence on external loan providers while providing an extra incentive for individuals to join the organization.

This project could easily attract members as buying lottery tickets is a habitual behavior among the target demographic. Survey results indicate over 70% of respondents are interested in savings for retirement, with 90% of those under 30 expressing interest.

Conclusion

This paper focuses on the Thai pension system, which has been ranked the lowest among 44 countries surveyed by The Mercer CFA Institute Global Pension Index. A significant weakness that needs to be addressed is the pension system provided for the Thai workforce employed in the informal sector.

Currently, the project to support long-term savings for the workforce in the informal sector provided by the government, both the National Savings Fund (NSF) and the Social Security Fund insurers under Section 40, has not been successful. Only 27.45% of informal workers nationwide participate, leaving a significant portion without pension coverage. Consequently, many of them prefer to invest their money in the lottery as an alternative financial strategy.

To prevent wasteful spending on the lottery, Thailand should introduce the "Government Savings Lottery Fund for Retirement" for the informal sector. This initiative channels lottery expenses into long-term savings, generating returns through professional mutual fund investments. It offers monthly pensions to participants while boosting the capital market, tapping into the informal workforce's lottery familiarity to promote legal lottery engagement.

The results of the study are as follows.

1) The measurement of respondents' commitment to participate in the long-term savings program until retirement, without discontinuing halfway, is determined using three indicators: (1) the frequency of purchasing lottery tickets, (2) the intention behind purchasing lottery tickets, and (3) the funding source for purchasing lottery tickets. The findings indicate encouraging evidence that a significant majority, specifically 75.05 percent, of lottery buyers meet all three criteria.

2) To determine the size of the proposed pension scheme fund, the proceeds from the sale of lottery saving tickets are divided into three parts: (1) prizes for winners, (2) operational expenses, and (3) the remaining amount, which is the one that can be set aside as savings for the pension scheme. The actual contribution to the fund depends on the assumptions made for each scenario. The scenarios considered allotments of 20%, 40%, 50%, and 70% of the lottery revenue towards the pension fund. The research findings suggest that the proposed fund is expected to reach a substantial size once it is established.

3) In order to assess the sufficiency of retirement income, this research employs the poverty line as a benchmark, along with an old-age allowance ranging from 600 to 1,000 baht per month. For reference, the expected monthly pension from the Fund is projected to be roughly 3,000 baht in the next 20-year period and around 5,000 baht for a duration of 30 to 40 years.

4) This study presents two options for pension estimates as case studies. Case 1 examines the potential contribution that the majority of the target group can comfortably afford without changing their lottery purchasing habits. The average amount spent on lottery purchases is 6,938 baht per year. Case 2 seeks to determine the investment amount required to attain a pension amount greater than 5,000 baht, which is deemed sufficient for retirement in the next 30 to 40-year period.

Study results indicate that shifting spending from lottery tickets to long-term savings boosts lifetime monthly income, fostering enduring financial stability and alleviating government financial burdens. While adequate pensions sustain contributors above the poverty line, those with minimal contributions can seek alternatives like Government Pensions or Social Security Funds for post-retirement security (Section 40).

Currently, no retirement pension system designed for informal workers has succeeded elsewhere to serve as a suitable model for Thailand. While implementing such a program may affect revenue for The Government Lottery Office, it is crucial to recognize that most informal workers contribute minimally to lottery revenue due to their low incomes. Even though we suggest involving higher-income lottery buyers in the program to boost a larger pension fund for the program, and help those who need more monthly pension benefits, we recommend capping pension benefits for this group to ensure a fairer distribution from lottery sales.

Several Thai State Banks offer prize-linked savings programs, like the GSB savings certificate from the Government Savings Bank, lottery savings from the Bank for Agriculture and Agricultural Cooperatives (BAAC), and GH Bank's lottery savings. However, research by Pornpen Vora-Sittha in 2016 found these initiatives unattractive to lower-income individuals and unsuitable for retirement savings.

This study proposes the "Government Savings Lottery Fund for Retirement" as an innovative approach to utilize lottery funds and transform them into a comprehensive retirement solution. The newly created pension system for Thailand's aging society encompasses at least five aspects as follows:

a) Creating more inclusive labor coverage: The system aims to include both formal and informal workers, ensuring equal opportunities for all to accumulate retirement savings.

b) Raising the income level for retirees: Redirecting lottery profits to the pension fund and allocating this money back to lottery buyers at the age of 60 will help retirees earn more money.

c) Improving the capital market: If profits from lottery sales, currently benefiting The Government Lottery Office and illegal dealers, could be redirected to the pension fund by investing in the capital market, more money will flow into the capital market.

d) Ensuring long-term financial sustainability: If profits from lottery sales are allocated to the lottery pension fund, returns could be generated to support retirees.

e) Avoiding becoming a fiscal burden: This strategy not only reduces the future burden on public finances but also addresses the issue of inadequate savings in the country.

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