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The Impact of Compulsory Saving Schemes on Saving Behavior: Evidence from Thailand

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Abstract

Thailand has many compulsory saving schemes for longevity and income uncertainty at old age. A crucial question is whether how saving schemes affect saving behavior. The Blinder-Oaxaca decomposition method shows that compulsory saving systems induce formal workers to save more than informal workers. Because compulsory saving is one of the saving channels that offers a high return to savings and provides the other social welfares that reduce the cost of living. However, low-income informal workers have a higher saving incentive to compensate for the lack of compulsory savings. Moreover, the difference in the compulsory saving schemes between government employees and private employees induce private employees to save more than government employees.

Keywords: Compulsory Saving Schemes, Saving Behaviors, Blinder-Oaxaca Decomposition Method, Informal Workers, Thailand

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บทคัดย่อ

ประเทศไทยมีระบบการออมภาคบังคับหลากหลายระบบโดยมีวัตถุประสงค์เพื่อเป็นหลักประกันรายได้ยามชราภาพ ดังนั้น จึงเกิดคำถามที่สำคัญ คือ ระบบการออมรูปแบบต่างๆ ส่งผลกระทบต่อพฤติกรรมการออมอย่างไร ผลการศึกษาจากวิธี the Blinder-Oaxaca decomposition method พบว่า ระบบการออมภาคบังคับส่งผลให้แรงงานในระบบออมเงินสูงกว่าแรงงานนอกระบบบำนาญภาคบังคับ สาเหตุเนื่องมาจาก ผลตอบแทนจากการออมเงินในระบบการออมเงินภาคบังคับให้ผลตอบแทนสูง จึงสร้างแรงจูงใจให้ออมเงินเพิ่มสูงขึ้น อีกทั้ง ระบบการออมภาคบังคับยังให้สวัสดิการสังคมอื่นๆ อีกหลายด้าน ซึ่งสวัสดิการเหล่านี้ส่งผลให้ลดค่าใช้จ่ายในการดำรงชีวิต แรงงานในระบบจึงมีเงินเหลือออมมากขึ้น อย่างไรก็ตาม ผลการศึกษากลับพบว่า การไม่ได้อยู่ในระบบการออมภาคบังคับของแรงงานนอกระบบที่มีรายได้น้อยส่งผลให้สมัครใจออมเงินสูงกว่าแรงงานในระบบที่มีรายได้น้อย สาเหตุเนื่องมาจากแรงงานนอกระบบที่มีรายได้น้อยต้องสมัครใจออมเงินเพิ่มสูงขึ้นเพื่อชดเชยกับการขาดหายไปของเงินออมภาคบังคับ นอกจากนี้ ระบบบำนาญที่ต่างกันของข้าราชการและพนักงานเอกชนส่งผลให้พนักงานเอกชนออมเงินมากกว่าข้าราชการ

คำสำคัญ: ระบบการออมเงินภาคบังคับ, พฤติกรรมการออม, วิธีการแยกองค์ประกอบแบบ Blinder-Oaxaca, แรงงานนอกระบบ, ประเทศไทย

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ผู้เขียนขอบขอขอบคุณความคิดเห็นและข้อเสนอแนะจาก ศาสตราจารย์ ดร.ณัฏฐพงศ์ ทองภักดี, รองศาสตราจารย์ ดร.อมรรัตน์ อภินันท์มหกุล, ผู้ช่วยศาสตราจารย์ ดร.วิศิษฏ์ ชัยศรีสวัสดิ์สุข, และผู้ช่วยศาสตราจารย์ ดร.นิรมล อริยอาภากมล

1) Introduction

Differential saving schemes cover all Thai citizens who can access them through two systems. The first is the compulsory saving system, which is offered to only formal workers[1]. Most of these workers are employees of the government, state enterprises, or private companies. The other scheme is the voluntary saving system, which is partly proposed for informal workers, including employers, own-account workers, and unpaid family workers. It implies that they lack risk-sharing mechanisms, which can help them to ensure their income and longevity risks adequately. Nevertheless, formal workers can access the voluntary saving system as well.

The compulsory saving schemes have differences in target groups, financing methods, and benefit payments. The Old-Age Allowance System (OAA: the zero pillar) is a non-contributory scheme financed by the annual government budget. The system is purposed to guarantee a basic income for the elderly aged 60 or above who do not receive any public pensions, including informal workers and private employees. The monthly pension payment offered varies by the age of the recipients. The older adult who aged 60–69, 70–79, 80-89 and above will receive 600, 700, 800 and 1000 baht/month respectively.

The Civil Servant Pension scheme (CSP: the zero pillars) is provided for government employees. The CSP is a non-contributory defined benefits scheme financed by the annual government budget. It provides government officials with a guaranteed retirement income with generous benefits. However, the monthly pension amount cannot exceed 100 percent of last month's salary, and the officials must have at least 25 years of service.

The Social Security Fund (SSF: the first pillar) is offered to employees working in the private sector. This system is a mandatory contributory system. It secures not only for an old-age pension but also ensures against unknown emergencies such as unemployment, child allowance, death, sickness, disability, and assistance for the family. The insured members will receive the monthly pension for pension benefits as computed as twenty percent of the average continued monthly salary for the last five years, which is roughly 3,000 to 6,375 baht per month, they need to be a member more than 15 years.

[1] Formal worker is referred to as employed persons who have social security from work. While the informal worker is referred to as employed persons, who do not have social security from work like formal employment, The Informal Employment Survey (2018).

The Government Pension Fund (GPF: the second pillar) is a mandatory defended contribution plan. It is offered to government employees who were hired before establishing the fund to be a voluntary member of the GPF system and to those engaged after the year of establishing the fund. Under the GPF system, the government contributes three percent of the official's monthly salary, and the officials cannot contribute more than fifty percent of their monthly salary. When the officials retire, they gain a lump-sum retirement allowance from the GPF together with a traditional pension from the CSP scheme. However, the monthly pension amount is highest at 70 percent of the average salaries for the last 60 months.

The Teachers' Provident Fund (TPF: the second pillar) is a mandatory defined contribution. This fund is organized particularly for teachers of private schools (private employees). The member needs to contribute three percent of their salary, the school has to provide another three percent, and the government must make a co-contribution of six percent. The government contribution cannot allocate into an individual account, but it holds in a separate account, and it provides the welfare benefits for members and their families.

The voluntary saving schemes have many systems. The Provident Fund (PVD: the third pillar) is a voluntary defined contribution system. It is established under a contract between worker and employer to offer an opportunity to save for retirement to the worker. Both workers and employers must contribute to the fund together. The employee must provide at least three percent but cannot exceed 15 percent of the salary. The employer has to contribute not less than the employee's contribution. Concerning termination, the worker will obtain a lump sum at their resignation, retirement, or death.

The mutual fund management companies offer the Retirement Mutual Fund (RMF: the third pillar) to investors/ workers who want voluntary retirement savings. The persons must continuously save in RMF until the age of 55 except for years when they do not have any income. Additionally, the saving rate needs to at least three percent of monthly income or 5,000 baht, whichever is lower. The RMF is principally appropriated for those who are not eligible to be a member of PVD or wish to have additional savings for retirement.

The Social Security Fund with chapter 40 (SSF; third pillar) permits informal workers to enroll in this voluntary system. This scheme is voluntary in which members can choose one of two options. For the first option, the member must contribute 70 baht/month, and the government will provide 30 baht/month. Members will gain a benefit, including compensation in disability, sickness, and death. For the second option, the member must contribute 100 baht/month, and the government will contribute 50 baht/month. This option will provide the above benefits added to old-age savings.

Recently, there is a newly launched saving scheme named the National Pension Fund (NPF; the third pillar). It is mainly intended to cover informal workers. In terms of membership, the eligible members are Thai citizens aged from 15 to 60 who are not protected by any other pension schemes established by the government. Under this scheme, the member has to contribute 50 to 13,200 baht per year, and the government will be a co-contributor with the member. This scheme provides a lump-sum or monthly payment to members.

The objective of this study is to consider the effects of compulsory saving schemes or pension systems on saving behavior, related to the observable characteristics or the benefits of saving schemes. In other words, this study aims to analyze the causes of savings differences among persons who differ in the savings schemes. It is essential to determine that compulsory saving schemes encourage formal workers to save more or discourage saving. At the same time, it must be determined that informal workers who do not have mandatory savings have a higher saving incentive to compensate for the lack of compulsory savings.

It is necessary to determine such a perspective for various reasons. First, the persons differing in the compulsory pension systems lead to the differences in saving behavior because the Life Cycle Hypothesis states that people decide to consume and save by considering the highest satisfaction based on income throughout the life span. The pension benefit is then viewed as one of the factors that determine the current consumption and savings. Second, there is a significant income gap and a substantial degree of income volatility among persons, which leads to different saving behaviors. Attanasio and Brugiavini (2003) found that liquidity constraints might lower discrimination among poor households. Likewise, Engelhard and Kumar (2011) found that the discrimination effect is more significant at higher wealth quintiles.

Next, there is a substantial difference in education levels among persons that can induce different saving behaviors. Dynan, Skinner, and Zeldes (2004), Bozio, Emmerson, Cormac O'Dea, Tetlow (2013), Gandelman (2015) showed that education level strongly influences household savings. In Thailand, the survey data reports that most of the formal sector workers achieve the education level equal to or higher than the bachelor's degrees. In contrast, most of the workers in the informal sector attain only a primary level.

This paper employs the Blinder-Oaxaca decomposition method to complete the objectives. Since this method allows us to decompose the causes of savings difference, it can be separated into two portions. A first portion is called the endowment effect. It is described by differences in the observable characteristics of workers or by differences in the determinants of saving, such as age, income, education, and other aspects. A second portion is called the discrimination effect. This part evaluates the discrimination effect of the saving schemes on saving behaviors.

This paper is organized as follows. The next section reviews the literature associated with the purpose of this study. The third section explains an econometric methodology. The fourth section displays and discusses the empirical results. A final part is a conclusion.

2) Literature Review

This chapter reviews the literature related to determinants of household and individual savings and associated with the impact of the compulsory pension system on savings and wealth accumulation.

The determinants of household and individual savings

As suggested by the life cycle hypothesis theories, individuals or households have a decision to consume and save within the principle of the intertemporal utility maximization framework. An individual chooses current consumption and saving to the smooth utility over time. They decide how much to consume and how much to save, which keeps information in mind for their future expectations. Many studies (Lusardi, 1997; Chyi & Liu, 2007; Bebczuk et al, 2015) confirm that the relationship between savings and age is likely to be an inverted U curve or the concave function. It indicates that the savings will increase with age, but the rate of growth increases at a declining rate.

Moreover, Feng et al. (2011) determined the effects of observable characteristics on savings. They found that males save more than females. Because males may have a higher level of wage income than females. Nonetheless, Beckmann, Hake, and Urvova (2013) found that females save more. They claimed that this relationship might be since women have a higher life expectancy than men and therefore need to keep more to maintain their more extended consumption periods. Then she has a higher propensity to save.

Furthermore, Alessie, Angelini, and Santen (2013) further recommended that marital status is another critical variable in determining savings. They found that those who are married save more than the unmarried because the married have multiple sources of income and also have the economies of scale of spending on necessary goods in their household. However, Mosk (2010) found that widowed saves more than others because they face more unanticipated and extra risks of life, such as rearing children alone.

The members of the household should be investigated as a proxy of family size. The vast literature believes that the large size of the household is naturally related to higher savings. Mishra, Uematsu, and Powell (2012) and Pan (2016) found that households with large family sized in the USA and China save more. Moreover, Kraay (2000) explains that if the size of households reflects a large number of children, it creates a household with strong bequest motives.

Education is one of the essential determinants of saving. Education directly affects income and saving behaviors because it increases labor productivity, rising personal income, and savings. Moreover, education can affect saving indirectly through financial literacy as having higher financial literacy also will result in higher savings (Lusardi, 2008). Financial literacy also enables people to know the risk and return characteristics of the different financial products, allowing them to save and secure a comfortable retirement. Therefore, most studies found that higher educational level strongly induces higher savings (Lusardi, 1998; Attanasio & Brugiavini, 2003; Feng et al., 2011; and Alessie et al., 2013).

To further investigate wealth effects on saving, homeownership offers itself to many inconsistent results on saving. First, once the households do not become homeowners, they have to pay rent, which may discourage saving. Second, once households plan to buy a house, the frugal attitude induces them to save more. Finally, a house as real estate can serve as collateral.

They may loosen financial constraints and reduce household saving efforts. Moreover, some empirical studies, such as Chandavarkar (1993) show that homeownership encourages the household to save more. Like Singapore, the government enforces mandatory saving for citizens buying a house or apartment, which is a positive effect on saving.

Another reason to save is the precautionary motive. Browning and Lusardi (1996) point out that one of the most critical features of precautionary saving is uncertainty on future income. For example, households having a higher variance in future income will have higher savings. In other words, the risk harms consumption but has a positive effect on savings because it creates demand for precautionary saving.

The assumption of perfect capital markets implies that the individual can borrow or lend as much as they wish. This assumption has been broadly questioned. In practice, the individual often faces liquidity constraints due to their limited access to borrowing. Browning and Lusardi (1996) argued that the behavior of agents facing liquidity constraints could be similar to that observed in individuals with precautionary saving motives. It is hard to disentangle both motives. Moreover, Deaton (1991) showed how the presence of liquidity constraints reinforces the precautionary purpose.

The effect of the compulsory pension system on household savings and the wealth accumulation

The attempts to examine the impact of compulsory pensions on savings have received considerable attention in the empirical literature on public finance. However, the results of those studies have been inconclusive on whether mandatory savings encourage the household to save more or distort the saving behavior. Feldstein (1974) was the first author who examined the relationship between social security wealth and private savings in the United States of America (USA). Based on the time-series of macroeconomic data, the Ordinary Least Square (OLS) estimation indicates a significantly adverse effect of social security wealth on savings. Social security wealth decreases private savings by 30-50 percent.

However, estimates made using macroeconomic data might produce inconsistent results because the data on the National Account cannot observe the heterogeneities among households. Therefore, various studies have instead of survey data. Most papers confirmed that pensions decrease household savings, but the estimated results vary substantially

depending on the method and pension specifications. For instance, Feldstein and Pellechio (1979) indicated that social security wealth completely substitutes non-pension wealth. A one-dollar increase in pension wealth would reduce other wealth by one-dollar. A later study by Blinder, Gordon, and Wise (1981) found a smaller substitution effect, and the offset effect is approximately thirty-nine percent. Likewise, the evidence in Diamond and Hausman (1984) indicated that if the pension wealth increases by one dollar, it causes the non-pension wealth to decrease in the range of thirty to fifty cents. Similarly, King and Dicks-Mireaux (1982) pointed out that the offset effect is around thirty percent.

Gale (1998) was concerned with the differential effects across households. He addressed the problem by separating households into two groups. A first group is based on saving motivations. The results showed that the household that has the saving incentive for retirement would have more of an offset effect than others because the household highly concerns about the pension benefits in the future. A second group is based on years of education. The results revealed that households with higher education levels would have more of an offset effect than others. More educated households may be more likely to be familiar with financial literacy and face lower relative demand for precautionary saving.

Rather than using the data on wealth accumulation, Attanasio and Rohwedder (2003) considered the effect of pension wealth on saving rates. They employed the differences-in-differences estimations to examine the impact of pension reform on household saving rates in the United Kingdom. The reductions are the benefits of the Basic State Pension (BSP) and the State Earning-Related Pension Scheme (SERPD). The empirical results showed that wealth accumulation in the SERPD is highly substitution because this scheme covers the most high-income households. However, the result of BSP is the relative difference; the change in the BSP wealth does not have any significant effect on the saving rate. One possible explanation might be the fact that the low-income household is usually entitled to the BSP. In other words, when the poorer are likely to face the income constraint, the substitution of public pension wealth on the saving rate is relatively small.

Furthermore, Attanasio and Rohwedder (2003) considered the degree of substitutability across age-cohorts. They obtain a degree of substitutability around 0.65 for 43 to 53-year-olds and 0.75 for 54 to 64-year-olds. This finding implies that a reduction in future pension benefits affects the savings rate of a younger cohort less than an older cohort because the young have

more time to absorb the change before retirement. However, Feng et al. (2010) found that the pension reform induced the household saving rate to rise by about 6 to 9 percent for workers age 25 to 29 and by roughly 2 to 3 percent for workers age 50 to 59. A reason that the younger cohort's offset effect is more significant than, the older group is because policy reform reduced the replacement ratio, which devotes the younger cohort to the rise in saving rates. The study, like Attanasio and Brugivini (2003), considered the effect of policy change on Italy's pension benefits. They found that substitutability is mostly perfect for workers aged between 35 to 45.

To investigate the effect of pension reform in China, Feng et al. (2010) applied a life-cycle model to develop the saving equation that augmented the expected public pension wealth to determine their impact on household savings. After the policy reform, it was clear that the heads of households in the enterprise sector would have a significant reduction in pension wealth. However, there is still a small reduction for the household head who works in the public sector. The econometric evidence shows significant offsets of the effects of pension wealth on saving rates in two worker groups. The estimations display a significant offset ranging from 10 to 16 percent, and a reduction in pension wealth increases the household saving rate by reducing spending on education, health, and consumption goods.

Moreover, Pan (2016) investigated the rinsing of rural and urban saving rates in China during the reform across the whole savings distributions. The results revealed that there are differences in fundamental reasons to increase savings between both households. The most substantial increase in the saving rate of households in the rural area appears at lower quintile; the higher quintile saving rate has a negative rate. Nevertheless, the saving rate of households in urban areas increases the most at higher percentiles. The decomposition method with quintile estimation shows that a substantial portion of the rural saving rate increase is due to rising income or changes in household characteristics (the endowment effect.) However, a significant part of the urban saving increase is likely to be encouraged by changes in the social security policy, such as tuition, housing, pension, and health care reforms (the discrimination effect). A series of social security schemes cover urban households, and the reduction in social security benefits makes urban households save more.

From past studies, it has been found that almost studies do not investigate the cause of saving behavior differences between the person who participates in the compulsory saving schemes (formal workers) and who do not participate in the mandatory saving schemes (informal workers). It is interesting to know that they have the same saving behavior or not, and what factor determines the saving differences. This study needs to fulfill this research frontier.

3) Methodology and Data

Because a large number of samples in the survey data declared that they do not save at all, the saving value includes many observation variables with zero. In some cases, the representative sample may have negative savings, but they report that they do not save. Consequently, the saving values in the survey data begin with zero value and strictly continuous positive values. The Ordinary Least Square (OLS) estimation will then yield inconsistent estimates of the interesting parameter and will produce misleading results. Therefore, James Tobin also originally developed the Tobit estimation concerning the censored data. In a general version of the Tobit model, the dependent variable takes on the zero value. The strictly positive value with positive probability represents a continuous random variable over that value.

Moreover, the estimation of this study is conducted by employing data from the Thai Household Socioeconomic Panel Survey data. Then, the Random-effect Tobit model is applied. The estimated regression model is adopted from the model of saving determinants founded in the previous literature. Formally, it can be written as

$$S_{it} = \beta_0 + \beta_1 X_{it} + \gamma_i + \varepsilon_{it} \quad (1)$$

For i is presented a number of persons/workers [$i = 1,...,N$], t is represented as a period of survey year[t=2005,2006,2007,2010,2012]. The random-effects[2] (γ) is *i.i.d.,* $N(0, \sigma_\gamma^2)$, and is a time-invariant individual-specific effect. ε is *i.i.d..* $N(0, \sigma_\varepsilon^2)$ is independent of γ. S represents the overall monthly amount of savings of persons i at time t that the representative sample declared in the survey data, which may include cash, financial and non-financial assets. The

[2] If the individual specific effect(γ_i) is independent of the repressors (X_{it}), the interesting parameters can be consistently estimated with a random effect model.

vector X is explanatory variables that determine the saving behaviors founding in the last section, which can be summarized as follows.

Since life-cycle theory suggests that the observables' characteristics of persons influence savings decisions, this paper also includes age (ageZ), age-squared (agesqrZ), and a dummy represents the persons was born in a year between 1980 to 2006 (GenY) to capture the different saving preference between generations. Moreover, a dummy variable for the female (female) person and a variable indicates the marital status in which the persons are married (married).

To control the effect of income on savings, this paper includes the total individual income (tincomeZ) that contains the labor income, profit from doing business, and others such as interest and dividend. Moreover, both dummy variables indicate the persons obtain the money or goods assistance from the government or other people outside households (income_gov), and the persons receive additional income, such as the income from the return on assets (income_asset). Besides, education is one of the essential determinations of saving. This paper constructs a number of the year at the highest attainment (schoolZ).

To concern the saving behavior and motives, a dummy variable represents that the persons continually save every survey year (saving8). For saving incentives, this paper constructs a dummy variable that indicates that the persons have the saving for retirement motive (OldAge). Moreover, economic theory also tells us that individuals save for precautionary reasons such as using during times of hardship, like illness or drought. A variable indicates that keeping for family security and spending in the household is introduced (precautionary). This variable is to investigate the risk aversion preference.

This paper constructs two variables to capture the effect of individual financial status. A dummy variable indicates that the persons have the source of loans from the informal financial institution (informal_loan). A dummy variable indicates they declare that they have a better financial status (better_financial) than the last year.

To control the households' characteristics, a variable indicates that there are members of households engaged in the agriculture sector (Agri). Additionally, the ratio of a member aged more than 70 years (member_elder) is included as a proxy of the dependency ratio as well as, the proportion of a member aged less than 15 years (member_child) to capture the saving motive for child's education and bequest in the future. A homeownership dummy variable (OwnedHouse) is included concerning the wealth of the household. To capture the region's effect on savings, there are a set of dummy variables that represent the regions (regions) and administrative areas (municipal).

The question of this study is to determine the effect of compulsory pension systems on the saving behavior among workers that differ in their saving schemes and income levels. However, the panel survey data used in this study do not have a question that indicates participation in the saving schemes of persons. This study implies using work status. Consequently, persons can be classified by their saving schemes and income levels into four groups. Firstly, the persons who participate in compulsory saving schemes (formal workers) include government employees and private employees (COM).

In contrast, the persons who are not covered by the compulsory saving schemes (informal workers) include employers, own-account workers, and unpaid family workers (NCOM). Secondly, the persons who join in the GPF are the government employees (GOV), and those who obtain pension benefits from the SSF are the private employees (PRI). Both receive mandatory saving schemes but the difference in the pension benefits.

Moreover, this paper classifies persons by using their average total household income. In this implementation, if the persons have an average total household less than the 50th percentile of their group, they are assigned as low-income. Therefore, the low-income formal workers (LowCOM) and low-income informal workers (LowNCOM) are grouped as well as the low-income government employees (LowGOV) and low-income private employees (LowPRI).

The Blinder-Oaxaca Decomposition

For the methodology detail, the most common way to study discrimination on individual saving behavior is to estimate it as regression (Blinder, 1973):

$$S_{it} = \beta_0 + \beta_i X_{it} + \varepsilon_{it} \quad (2)$$

This study is particularly interested in comparing the saving behavior differences of two groups, and it will estimate the saving equation like (2) for each group:

$$S_{it}^1 = \beta_0^1 + \beta_i^1 X_{it}^1 + \varepsilon_{it}^1 \quad (3)$$

$$S_{it}^2 = \beta_0^2 + \beta_i^2 X_{it}^2 + \varepsilon_{it}^2 \quad (4)$$

Given (3) and (4), it is a simple matter to compute the portion of the differential in saving of two groups as (5)

$$T = \beta_i^1 (X_{it}^1 - X_{it}^2) + X_{it}^2 (\beta_i^1 - \beta_i^2) + (\beta_0^1 - \beta_0^2) \quad (5)$$

This decomposition is a “Twofold.” That is, the differential is divided into two portions: [T=E+(C+I)]. A first portion is the endowment effect (E), which is an amount to be the part of the differential that is due to differences in the persons’ characteristics.

$$E = \beta_i^1 (X_{it}^1 - X_{it}^2) \quad (6)$$

It is the value of the advantage in endowments the first group possesses, as evaluated by the first saving equation. It is the sum of the coefficient vector of the repressors of the first group times the difference in mean between the first group and second group for the vector of re-pressors. Then, this part would measure the expected change in the mean of the second group if they had the same coefficients of saving equation as the first group.

A second portion is the discrimination effect (C+I). The coefficient part (C) of the differential is measured by the contribution of difference in the coefficient.

$$C = X_{it}^2 (\beta_i^1 - \beta_i^2) \quad (7)$$

It sums the difference between how the first-saving equation would value the characteristics of the second-saving group and how the second-saving equation values them. It is the sum of the difference between the regression coefficients of the first group and the second group time, the mean of the second group's observable characteristics. Then, the coefficient part measures the expected change in the mean of the first group if they have the same observable characteristics as the second group. Another is the unexplained part of the differential (I), which is the difference in intercept between the first group and the second group.

$$I = (\beta_0^1 - \beta_0^2) \quad (8)$$

For brevity, the first sum is "attributable to the endowment," while the second is "attributable to the coefficients."

Data

The estimation is conducted by employing data from the Thai Household Socioeconomic Panel Survey data collected by the office of the National Statics Office (NSO). The survey is a continuous series of national longitudinal data that began in 2005 and continues to 2006, 2007, 2010, and currently 2012. The information covers both inside and outside administration areas of 77 provinces in Thailand. Approximately 21,450 samples were chosen in the first round, and these samples were about 24,651 24,502 21,963 and 21,023, respectively.

A household member is observably repeated over time through a monthly questionnaire on individual characteristics, health, employment, earning, expenditure, debt, savings, and financial status. The sample is restricted to individuals between 18 to 60 years old and reports their work status or participation in compulsory saving schemes. Moreover, the sample is limited to the individual with a total individual income larger than 5,000 baht per month. Additionally, most of the variables used in the study are dummy variables, except age (ageZ and agesqrZ), the total individual income (tincomeZ), and a year of the highest education (schoolZ). So, this study is conducted normalization of these variables by the standardization method to the comparable size of coefficients. Therefore, the total observations are 21,152 samples, including 16,023 who participate in the compulsory saving schemes and 5,129 who do not participate in the mandatory saving schemes.

4) Results

This section presents the empirical findings of saving determinations and analyzes the causes of savings differences among persons differing in the compulsory saving schemes.

The empirical results of saving determinations

The estimated effects of observable characteristic variables are shown in Table 1. The coefficient sign of age (ageZ), and squared age (agesqrZ) is positive and negative, respectively. The relationship indicates that average monthly savings will increase with age, but the rate of growth increases at a declining rate. It is interesting to note that it does not have significance to the informal workers; one reason may be due to the earning of informal workers depends on experiences and market competition rather than age profiles.

Moreover, persons who are born between 1980 to 1997 (GenY) is negative and significant to saving only the (high-income) government employees (GOV). It implies that they were born during a time of many changes, such as values, technology, the internet, and easy access to credit cards. This generation, therefore, is provoked to have a low tolerance. Another possible explanation may be due to the different saving preferences between generations.

Further, female (female) will save between 0.0989 and 0.6748 percent more than males because of the nature of the Thai women not spending as extravagantly as men. Females have a longer life expectancy than males, so they need to save more to have sufficient income for longer life (Beckmann et al., 2013). Moreover, married status (married) has a statistically positive significant effect on savings. One reason is due to married life having the economies of scale for necessary expenditure in the household.

The total individual income (incomeZ) is also a crucial factor in determining savings in all groups. It found that the Marginal Propensity to Save (MPS) is equal to approximately 0.1240 to 3.4933 percent. This relationship implies that, if other things held constant (Ceteris paribus), the total individual income increases by 1 percent, the saving will increase by 0.1240-3.4933 percent. The estimated coefficients among income quintiles (qtHHtincome) also indicate that MPS is the significant difference between particular income groups. The MPS has a trend towards increasing with the average household income.

Additionally, the receiving of income transfers from the government (income_gov), such as subsidies or income grants from relatives/friends, also affects saving behavior. However, it is significant only for the government employees (GOV) because they have a probability of getting the most aids from the government. Moreover, this result shows that the persons having other sources of income, such as interest or dividends (income_asset), will save more than others in all groups. This founding may be indicated that the return on asset is the additional determinant to savings.

Another critical variable affecting saving is educational attainment. The maximum years of the highest education achievement (schoolZ) are significant to encourage savings behavior. This is due to people with higher education having more excellent financial knowledge. Moreover, Lusardi (2008) found that people with low financial experience will lack financial planning knowledge, resulting in smaller savings. Similarly, Lusardi and Mitchell (2007) found that the low assets of people near retirement are because they do not have good financial knowledge or are not familiar with the economic concepts of saving and investment decisions. Nonetheless, these reasons cannot apply to low-income government officials (LowGOV).

When considering the saving incentives, this study found that persons who consistently save every survey-years (saving8) save more than others in all groups. Moreover, these results show that persons have the saving incentive for retirement (OldAge) save a higher than other purposes in all groups. Additionally, persons having the saving for precautionary motives (precautionary) save more than other objectives in all groups as well. This result is in line with Sirisankanan (2013), who investigated the capabilities of Thai farmers in preventing the effects of income uncertainty on consumption and savings. The results indicated that Thai farmers had savings behaviors to avoid risks arising from income.

When considering financial status, it is worth noting that only persons who work in the informal sector (NCOM) who have the source of loans from non-financial institution systems (informal_loan) save significantly less than others. However, the private employees who have the source of loans from non-financial institution systems save considerably more than others. The results of this study, similar to Zeldes (1989), found that persons who cannot access loans from financial institutions, tend to reduce consumption levels and increase savings. Moreover,

the variable represents the persons report that they have better economic status than last year (better_financial). The results show that there is a positive and significant correlation with savings in all groups.

To determine the household characteristics, a variable represents having any household members working on agriculture (Agri). It does not have statistical significance and consistency signs for savings in all groups. Whereas the old-age dependency ratio (member_elder) is negative and significant only for the persons in the compulsory saving scheme (COM) as well as the child-dependency rate (member_child) is positive and significant only for the formal workers, it indicates that they have the strong saving incentive for the future education. Moreover, the low-income formal workers (LowCOM) who have homeownership (OwnedHouse) trend to save significantly higher than others because they don not to pay rent.

For the home location, this study found that the private employees in the urban area (municipal) have a significant to save less than others, which is consistent with Pootrakool, Ariyapruchya & Sodsrichai (2005). The reason that metropolitan areas have higher costs of livings than rural areas. However, it cannot be applied to the government employees (GOV) who have their homes in the urban area and save more than others. Finally, persons who live in Bangkok and its vicinity (bkk)[3] save averagely higher than other regional areas. It may be that the salary in the metropolitan area is higher than the country towns.

[3] The bkk is the reference variable.

Decomposition Analysis

The causes of saving differences between the formal workers and the informal workers (Model 1)

The result of decomposition analysis between the formal workers (COM) and the informal workers (NCOM) in Table 3 indicates that there is only 7.71 percent in saving differences (T) in favor of the informal workers.

However, 48.65 percent (E) can be attributed to the formal workers' advantage in the endowments to saving. It means that if the formal workers have the same coefficients of saving equation as the informal workers, they will save 48.65 percent more than the informal workers. In other words, 48.65 percent of saving difference is due to the formal workers having higher saving endowments, and it relates to the saving motives for precautionary (precautionary) and retirement (OldAge), the consistency saving behavior (saving8) and education attainment (schoolZ).

Moreover, the coefficient contribution reflects 36.34 percent (C) in favor of the formal workers. It means that if the formal workers have the same observable characteristics as the informal workers, they will save 36.34 percent more than the informal workers. It relates to a higher marginal propensity to save (qtHHincome). The reason is that the compulsory saving scheme is one of the saving channels that offers a high return to savings. The employers must contribute together with the employees[4]. These incentives can induce formal workers to save more.

Additionally, formal workers also have other forms of social welfare, such as medical treatment, child education allowance, house rent, maternity benefits, and disability, death, and unemployment benefits. These benefits reduce their cost of living, thus allowing them to save more than informal workers. This finding is in line with Pan (2016), who found a similar effect of social security on household savings in China.

[4] for example, the saving return of the GPF is quite high (5-6%) when compared with others, and the government employees who are a member of the GPF can voluntarily save up to 15 percent of their salary. Beyond this, private employees can contribute to saving the PVD up to 15 percent of the wage, and the employer has to contribute less than the employee's contribution.

Surprisingly, there remains a substantial part of the savings differential that can be attributed to the other factors outside the saving equations, such as religions, family support, health, and the ability to access technology to save. It reflects 92.71 percent (I) in favor of the informal workers. Therefore, 730.79 percent of the total saving difference (D/T) is attributed to the discrimination effect, which is dominated by the unexplained part. However, 630.79 percent (E/T) is due to the endowment effect.

The causes of saving differences between the low-income formal workers and the low-income informal workers (Model 2)

The result of the decomposition analysis between the low-income formal workers (LowCOM) and the low-income informal workers (LowNCOM) is shown in Table 4. It indicates that the overall saving difference is 124.67 percent in saving differences (T) in favor of the low-income informal workers.

Moreover, it can be pointed out that 54.30 percent (E) can be attributed to the low-income informal workers' advantage in the endowments to saving. It means that if the low-income informal workers have the same coefficients of saving equation as the low-income formal workers, they will save 54.30 percent more than the low-income formal workers. In other words, 54.30 percent of saving difference is due to the low-income informal workers having higher saving endowments. The substantial endowments contribution to the saving differential is related to the saving motives for retirement (OldAge) and the total individual income (tincomeZ). All of this difference accounts for nearly 97 percent of the total saving differential.

Besides, the coefficient contribution reflects 43.07 percent (C) in favor of low-income informal workers. It means that if the low-income informal workers have the same observable characteristics as the low-income formal workers, they will save 43.07 percent more than the low-income formal worker. It relates to a higher marginal propensity to save (tincomeZ) and consistency saving behaviors (saving8). A reason is due to the low-income informal workers not participating in any compulsory saving schemes and not having the other security benefits such as medical treatment, child education allowance, house rent, maternity benefits, and disability, death, and unemployment benefits that can help to reduce the cost of living equivalent to the formal workers. They then have to voluntarily save to spend during old age or in an emergency.

Furthermore, there are saving differences due to other factors outside the saving equations. It reflects 27.29 percent (I) in favor of the low-income informal workers. Therefore, 43.56 percent of the total saving difference (E/T) is attributed to the endowment effect. In comparison, 56.44 percent (D/T) is due to the discrimination effect, supplemented by the other outside the saving equation.

The causes of saving differences between the government employees and private employees (Model 3)

The result of decomposition analysis between the government employees (GOV) and private employees (PRI) in Table 5 is clear that the overall saving differential is equal to 331.12 percent of saving the difference (T) in favor of the government employees.

Moreover, the result shows that 183.04 percent (E) can be contributed to the government employees' superior endowments to saving. That is, if government employees have the same coefficients of saving equation as the private employees, they will save 183.04 more than the private employees. In other words, 183.04 percent is due to the government employees have higher saving endowments. The essential advantage of endowments to saving are related to the saving behavior such as the consistency saving behavior (saving8) and the saving motives for retirement (OldAge) and precautionary (precautionary). All of this difference accounts for nearly 83 percent of saving differential that contributes to the difference in the endowments.

However, the coefficient contribution is 104.33 percent (C) in favor of private employees. It means that if the private employees have the same observable characteristics as government employees, they will save 104.33 more than government employees. The main reason why the coefficients show for higher savings for the private employees is that they need to save more to have sufficient income to live after retirement because the pension benefit of private employees is relatively low[5]. Moreover, they need to save more to prevent the emergence of illnesses that the social security benefit does not cover all the related medical care

[4] When considering the monthly pension payment, the official will receive pension payments in the highest cases at roundly 70 percent of the average salary for the last five years. In the 2018 fiscal year, the government officials received an average monthly pension of around 26,000 baht. Whereas, the private employees will receive a maximum pension of not more than 6,375 baht (if they are a member of the Social Security Fund for 30 years and their salary is more than 15,000 baht before five years retirement).

expenditures. They then have a higher awareness of saving motives for precautionary (precautionary) and retirement (OldAge).

Nevertheless, the government employees have a higher constant reflecting 252.42 percent (I). In sum, 55.28 percent of the total saving differential (E/T) is due to the endowment effect. In comparison, 44.72 percent (D/T) can be attributed to the discrimination effect, offset by the differences in how the endowment is unrewarded.

The causes of saving differences between low-income government employees and low-income private employees (Model 4)

The differences in savings of low-income government employees (LowGOV) and low-income private employees (LowPRI) in Table 6 indicate that the total saving difference is equal to 392.78 percent (T) in favor of the low-income government employees.

The total endowment to saving is contributed to 218.02 percent (E) in favor of the low-income government employees. This means that if the low-income government employees have the same coefficients of saving equation as the low-income private employees, they will save 218.02 more than the private employees. In other words, 218.02 percent is due to the low-income government employees having a higher saving endowment. The dominant endowment to saving is associated with saving motive for retirement (OldAge), the consistency saving behavior (save8), saving motivation for precautionary (precautionary), and the total individual income profile (incomeZ). This endowment differential accounts for nearly 90 percent.

However, the coefficient contribution is 101.73 percent (C) in favor of low-income private employees. It means that if the low-income private employees have the same observable characteristics as the low-income government employees, they will save 101.73 percent more than the low-income government employees. A reason that the-low income private employees save more is due to preventing the emergence of sickness that the social security benefit does not cover all medical care expenditures. Moreover, the pension benefit of private employees is relatively low. They need to save more to have sufficient income to live after retirement. Then, they have a higher awareness about saving motive for precautionary (precautionary) and retirement (OldAge).

Nevertheless, the exogenous variables outside the model can explain why the saving differential is equal to 276.49 percent (I) in favor of the low-income government employees. In sum, 55.51 percent of the total saving differential (E/T) is due to the endowment effect. In comparison, 44.49 percent (D/T) can be attributed to the discrimination effect, which is offset by the differences in how the endowment is unrewarded. Even though government employees have a higher level of saving capacity, they lack the saving incentive compared to private employees.

5) Conclusion

Thailand has many saving schemes for longevity and income uncertainty at old age. The compulsory saving system is offered to only formal workers, and the voluntary saving system is proposed for informal and formal workers. A crucial question is whether how compulsory saving schemes affect saving behavior, which is related to the observable characteristics or the effect of enrollment in pension schemes. It is essential to determine that compulsory saving schemes encourage formal workers to save more or discourage saving. At the same time, it must be determined that the informal workers have a higher saving incentive to compensate for the lack of compulsory savings.

This paper employs the Blinder-Oaxaca decomposition method to complete the objectives. Since this method allows us to decompose the causes of savings difference. The endowment effect is described by differences in the observable characteristics of workers or by differences in the determinants of saving, such as age, income, education, and other characteristics. The discrimination effect evaluates the distortionary impact of the compulsory saving scheme on saving behaviors.

The empirical result of saving determinations is in line with past studies. However, the decomposition method showing the results are differences. The causes of saving differences between the formal and the informal workers can be concluded as the discrimination effect is higher than the endowment effect, which is dominated by the unexplained part. The formal workers have an advantage in the endowments to saving, which relates to the saving motive for precautionary and retirement. Moreover, compulsory saving systems induce formal workers to save more than informal workers. Because compulsory saving is one of the saving channels that offers a high rate of return to savings and provides the other social welfares that reduce

the cost of living. However, low-income informal workers have an advantage in the coefficient contribution. A reason is due to the low-income informal workers not participating in any compulsory saving schemes and not having the other security benefits that can help to reduce the cost of living equivalent to the formal workers. They then have to voluntarily save to spend during old age or in an emergency.

The causes of saving differences between government employees and private employees are a contribution from the endowment effect higher than the discrimination effect. However, the coefficient contribution is in favor of private employees. A reason that the private employees save more is due to preventing the emergence of sickness that the social security benefit does not cover all medical care expenditures. Moreover, the pension benefit of private employees is relatively low.

Therefore, this study has policy recommendations as follows. **First**, the government should raise the earning of low-income workers, especially for the low-income informal workers due to the results of this study found that they have a higher the marginal propensity to save which lead them to have enough savings for consumption in a retirement period. **Second**, the government should improve the social welfare of informal workers to be equal to formal workers to reduce the cost of living, and then they will have enough money to save. **Third,** the government should encourage the employees to have consistency saving behavior. For instant, the government should increase the contribution rate of various funds such as the Social Security Fund, the Government Pension Fund, and the National Saving Fund to encourage the members to save. An increase in the contribution rate in the National Saving Fund can induce informal workers to be willing to be members of the NSF. **Furthermore**, the government should provide financial literacy for all employees through the education system. **Finally**, the government should provide information about the overall savings that each person should have for using in old age, which can create a person aware of the importance of the saving incentive for old age and emergency.

Table 1: Estimated Results from the Random-Effects Tobit Models

Variables	Model 1		Model 2		Model 3		Model 4	
	COM	NCOM	LowCOM	LowNCOM	GOV	PRI	LowGOV	LowPRI
ageZ	1.0046 ***	0.6871	0.4547	1.6374	0.4978	0.8805 **	1.6823 *	0.1798
	(0.3025)	*(0.7831)*	*(0.4748)*	*(1.1165)*	*(0.5660)*	*(0.3645)*	*(0.8808)*	*(0.5514)*
agesqrZ	-0.9077 ***	-0.7891	-0.4091	-1.6491 *	-0.5077	-0.6989 **	-1.8368 **	0.0099
	(0.2830)	*(0.6913)*	*(0.4593)*	*(0.9830)*	*(0.5073)*	*(0.3478)*	*(0.8204)*	*(0.5338)*
GenY	-0.2109 *	-0.1588	-0.2391	-0.0991	-0.4807 **	-0.1257	-0.3666	-0.0708
	(0.1194)	*(0.3505)*	*(0.1856)*	*(0.5217)*	*(0.2183)*	*(0.1411)*	*(0.2991)*	*(0.2262)*
female	0.1430 **	0.4039 ***	0.2759 ***	0.6748 ***	0.0989	0.1918 **	0.1599	0.4124 ***
	(0.0639)	*(0.1361)*	*(0.1035)*	*(0.1917)*	*(0.1009)*	*(0.0786)*	*(0.1683)*	*(0.1233)*
married	0.3013 ***	0.2989 *	0.3055 ***	0.5111 **	0.1477	0.3576 ***	0.1169	0.3946 ***
	(0.0680)	*(0.1601)*	*(0.1092)*	*(0.2238)*	*(0.1108)*	*(0.0831)*	*(0.1806)*	*(0.1305)*
tincomeZ	0.3115 ***	0.1240 ***	3.4933 ***	2.4862 ***	0.2258 **	0.3352 ***	2.9549 ***	2.9183 ***
	(0.0453)	*(0.0441)*	*(0.5578)*	*(0.7818)*	*(0.0920)*	*(0.0519)*	*(0.5405)*	*(0.7890)*
qt1HHtincome	-1.5063 ***	-2.0064 ***			-1.2860 ***	-1.4812 ***		
	(0.1234)	*(0.2296)*			*(0.2046)*	*(0.1464)*		
qt2HHtincome	-1.0760 ***	-1.7567 ***			-0.5275 ***	-1.2306 ***		
	(0.1155)	*(0.2232)*			*(0.1834)*	*(0.1373)*		
qt3HHtincome	-0.6182 ***	-1.2339 ***			-0.5438 ***	-0.7891 ***		
	(0.1057)	*(0.2136)*			*(0.1672)*	*(0.1265)*		
qt4HHtincome	-0.2295 **	-0.8087 ***			-0.1832	-0.2579 **		
	(0.0951)	*(0.2038)*			*(0.1512)*	*(0.1149)*		

Table 1: Estimated Results from the Random-Effects Tobit Models

Variables	Model 1		Model 2		Model 3		Model 4	
	COM	NCOM	LowCOM	LowNCOM	GOV	PRI	LowGOV	LowPRI
income_gov	0.1186	0.1643	0.0520	0.3333	0.3005 **	0.0547	0.5710 **	-0.0220
	(0.0877)	*(0.1966)*	*(0.1434)*	*(0.2918)*	*(0.1489)*	*(0.1062)*	*(0.2413)*	*(0.1735)*
income_asset	0.8016 ***	1.2672 ***	0.9164 ***	0.7583 ***	0.5072 ***	0.9975 ***	0.4616 **	1.0303 ***
	(0.0760)	*(0.1675)*	*(0.1557)*	*(0.2886)*	*(0.1069)*	*(0.1009)*	*(0.1998)*	*(0.1946)*
schoolZ	0.2488 ***	0.2255 ***	0.3073 ***	0.2095 *	0.1163 **	0.2950 ***	0.0468	0.3685 ***
	(0.0366)	*(0.0804)*	*(0.0636)*	*(0.1268)*	*(0.0584)*	*(0.0469)*	*(0.0932)*	*(0.0815)*
saving8	2.6462 ***	3.3938 ***	2.7147 ***	3.3933 ***	2.6671 ***	2.6211 ***	2.6937 ***	2.7409 ***
	(0.0719)	*(0.1512)*	*(0.1218)*	*(0.2246)*	*(0.1105)*	*(0.0888)*	*(0.1800)*	*(0.1480)*
OldAge	6.6001 ***	6.2464 ***	8.4689 ***	7.2772 ***	4.2377 ***	7.4569 ***	5.4239 ***	9.0022 ***
	(0.0798)	*(0.1669)*	*(0.1471)*	*(0.2556)*	*(0.1244)*	*(0.1005)*	*(0.2082)*	*(0.1811)*
precautionary	6.8015 ***	6.1438 ***	8.4979 ***	7.0154 ***	4.3413 ***	7.6199 ***	5.5803 ***	8.9586 ***
	(0.0731)	*(0.1559)*	*(0.1241)*	*(0.2363)*	*(0.1204)*	*(0.0903)*	*(0.1942)*	*(0.1499)*
informal_loan	0.1946	-0.5315 **	0.5097 **	-0.1991	-0.2457	0.3446 *	0.0429	0.5207 **
	(0.1594)	*(0.2229)*	*(0.2132)*	*(0.2946)*	*(0.2938)*	*(0.1884)*	*(0.4136)*	*(0.2437)*
better_financial	0.5597 ***	0.4497 ***	0.7558 ***	0.7956 ***	0.2825 ***	0.7026 ***	0.4041 **	0.9949 ***
	(0.0687)	*(0.1613)*	*(0.1190)*	*(0.2443)*	*(0.1036)*	*(0.0868)*	*(0.1767)*	*(0.1435)*
Agri	-0.0282	-0.2667	-0.1633	0.1654	-0.0869	-0.0435	-0.1594	-0.1929
	(0.0931)	*(0.1979)*	*(0.1381)*	*(0.2627)*	*(0.1331)*	*(0.1209)*	*(0.2046)*	*(0.1670)*
member_elder	-0.6823 ***	-0.6681	-0.7924 **	-0.6212	-0.7080 ***	-0.6310 **	-1.4471 ***	-0.4834
	(0.1963)	*(0.4689)*	*(0.3524)*	*(0.6704)*	*(0.2683)*	*(0.2585)*	*(0.4771)*	*(0.4303)*
member_child	0.4557 **	0.2284	-0.1241	-0.2472	0.5774 *	0.5515 **	-0.0948	-0.1924
	(0.1883)	*(0.3617)*	*(0.3078)*	*(0.5428)*	*(0.3027)*	*(0.2325)*	*(0.5045)*	*(0.3649)*
OwnedHouse	0.0133	-0.1165	0.2331 **	0.0315	0.1656	-0.1280	0.4595 **	0.2708 *
	(0.0680)	*(0.1480)*	*(0.1162)*	*(0.2198)*	*(0.1133)*	*(0.0827)*	*(0.1866)*	*(0.1396)*

Table 1: Estimated Results from the Random-Effects Tobit Models

Variables	Model 1		Model 2		Model 3		Model 4	
	COM	NCOM	LowCOM	LowNCOM	GOV	PRI	LowGOV	LowPRI
municipal	-0.1203	-0.0451	-0.0118	0.0268	0.1236	-0.2411 ***	0.3490 *	-0.1879
	(0.0731)	*(0.1541)*	*(0.1196)*	*(0.2155)*	*(0.1063)*	*(0.0927)*	*(0.1792)*	*(0.1433)*
center	-0.3314 ***	-0.3130 *	-0.3762 ***	-0.2279	-0.2207	-0.3182 ***	-0.2922	-0.5050 ***
	(0.0866)	*(0.1891)*	*(0.1419)*	*(0.2679)*	*(0.1448)*	*(0.1067)*	*(0.2393)*	*(0.1695)*
north	-0.3529 ***	0.3933 *	-0.1776	0.4992	-0.2343	-0.2770 *	-0.2640	-0.2821
	(0.1133)	*(0.2289)*	*(0.1842)*	*(0.3266)*	*(0.1558)*	*(0.1534)*	*(0.2611)*	*(0.2231)*
esan	-0.5785 ***	0.0217	-0.5708 ***	-0.2503	-0.2990 **	-0.7366 ***	-0.7178 ***	-0.7396 ***
	(0.1111)	*(0.2372)*	*(0.1881)*	*(0.3390)*	*(0.1453)*	*(0.1622)*	*(0.2506)*	*(0.2354)*
south	-0.1391	0.4782 **	0.1578	0.4124	-0.1176	-0.0908	-0.1703	0.0993
	(0.1166)	*(0.2295)*	*(0.1867)*	*(0.3222)*	*(0.1703)*	*(0.1502)*	*(0.2939)*	*(0.2209)*
_cons	-0.4671 ***	0.4600	-1.8579 ***	-1.5850 ***	1.5243 ***	-0.9999 ***	0.3433	-2.4216 ***
	(0.1392)	*(0.3096)*	*(0.2795)*	*(0.4690)*	*(0.2406)*	*(0.1654)*	*(0.3395)*	*(0.3830)*
No. of observation	16023	5129	8000	2556	3858	12165	1925	6053
No. of group	7505	2764	4893	1736	1610	6205	1042	3950
Log likelihood	-27682	-9913	-10854	-4387	-7920	-19425	-3685	-7549

Note: The observed information matrix (OIM) standard errors are in parenthesis.
Asterisks*, ** and *** denote significant level of 10%, 5% and 1% respectively.

Table 2: Summary of Decomposition Results

Summary of decomposition results	Model 1 (COM vs NCOM)		Model 2 (LowCOM vs LowNCOM)		Model 3 (GOV vs PRI)		Model 4 (LowGOV vs LowPRI)	
(as %)	%	%T	%	%T	%	%T	%	%T
Total differential (T=E+C+I)	-7.71		-124.67		331.12		392.78	
Endowments (E)	48.65	-630.79	-54.30	43.56	183.04	55.28	218.02	55.51
Discrimination (D=C+I)	-56.37	730.79	-70.37	56.44	148.08	44.72	174.76	44.49
due to coefficients (C)	36.34		-43.07		-104.33		-101.73	
due to intercept (I)	-92.71		-27.29		252.42		276.49	

Source: The author's calculation

Note 1) A + sign indicates an advantage for the first group, and a – sign indicates an advantage for the second group.

2) The decomposition results of all variables in the saving equations are variable for upon requests.

Table 3: Decomposition Result of Saving Differential between Formal Workers (COM) and Informal Worker (NCOM)

Variables	Amount Attributable	Amount Attributable to Endowments (E)	Amount Attributable to Coefficients (C)
ageZ	-46.37	-60.97	14.60
agesqrZ	48.70	54.05	-5.35
GenY	-4.69	-4.20	-0.50
female	-11.95	-0.03	-11.92
married	-4.30	-4.48	0.19
tincomeZ	-4.14	-7.60	3.47
qt1HHtincome	9.96	-0.22	10.18
qt2HHtincome	13.56	0.07	13.48
qt3HHtincome	12.50	0.16	12.34
qt4HHtincome	11.82	0.06	11.76
income_gov	-0.45	0.07	-0.51
income_asset	-6.62	0.71	-7.33
schoolZ	13.27	14.28	-1.02
saving8	-5.25	14.44	-19.69
OldAge	23.69	16.99	6.71
precautionary	40.38	25.24	15.13
informal_loan	5.54	-1.09	6.63
better_financial	4.05	2.13	1.92
Agri	3.46	0.00	3.47
member_elder	-0.64	-0.58	-0.06
member_child	1.74	-1.21	2.96
OwnedHouse	8.56	0.02	8.54
municipal	-4.46	0.21	-4.67
center	-0.89	-0.46	-0.43
north	-8.45	0.52	-8.96
esan	-6.99	0.16	-7.15
south	-7.04	0.39	-7.43
Subtotal	85.00	48.65	36.34
Summary of decomposition results (as %)			
Amount attributable	85.00		
'- due to endowments [E]	48.65		
'- due to coefficients [C]	36.34		
Shift coefficient [I]	-92.71		
Raw differential [T=E+C+I]	-7.71		
Adjusted differential [D=C+I]	-56.37		
Endowment as % total [E/T]	-630.79		
Discrimination as % total [D/T]	730.79		

Source: Author's calculation

Table 4: Decomposition Result of Saving Differential between Low-Income Formal Workers (LowCOM) and Low-Income Informal Workers (LowNCOM)

Variable	Amount Attributable	Amount Attributable to Endowments (E)	Amount Attributable to Coefficients (C)
ageZ	-93.41	-38.52	-54.88
agesqrZ	91.36	33.89	57.48
GenY	-7.98	-6.56	-1.41
female	-21.54	-1.67	-19.86
married	-19.31	-3.88	-15.43
tincomeZ	-48.67	-16.73	-31.94
income_gov	-2.97	0.07	-3.05
income_asset	-0.14	-1.76	1.62
schoolZ	4.02	10.01	-5.99
saving8	-22.69	-8.03	-14.65
OldAge	-15.36	-34.71	19.35
precautionary	49.03	16.89	32.13
informal_loan	4.86	-3.04	7.90
better_finiancial	1.21	1.83	-0.62
Agri	-5.93	-0.27	-5.66
member_elder	-0.90	-0.17	-0.73
member_child	1.70	0.16	1.54
OwnedHouse	12.98	-0.53	13.51
municipal	-2.17	0.07	-2.25
center	-5.38	-1.46	-3.92
north	-8.55	0.16	-8.71
esan	-3.77	0.37	-4.14
south	-3.75	-0.39	-3.36
Subtotal	-97.37	-54.30	-43.07
Summary of decomposition results (as %)			
Amount attributable	-97.37		
'- due to endowments [E]	-54.30		
'- due to coefficients [C]	-43.07		
Shift coefficient [I]	-27.29		
Raw differential [T=E+C+I]	-124.67		
Adjusted differential [D=C+I]	-70.37		
Endowment as % total [E/T]	43.56		
Discrimination as % total [D/T]	56.44		

Source: Author's calculation

Table 5: Decomposition Result of Saving Differential between Government Employees (GOV) and Private Employees (PRI)

Variable	Amount Attributable	Amount Attributable to Endowments (E)	Amount Attributable to Coefficients (C)
ageZ	39.60	28.66	10.94
agesqrZ	-34.04	-28.68	-5.36
GenY	-3.44	8.51	-11.96
female	-3.66	0.46	-4.12
married	-11.67	1.05	-12.72
tincomeZ	5.36	4.22	1.14
qt1HHtincome	4.30	0.33	3.97
qt2HHtincome	13.66	-0.21	13.87
qt3HHtincome	4.96	0.06	4.90
qt4HHtincome	1.49	0.00	1.49
income_gov	2.57	-0.42	3.00
income_asset	3.58	9.52	-5.95
schoolZ	7.92	7.60	0.32
saving8	73.21	72.05	1.16
OldAge	-3.67	55.53	-59.20
precautionary	-54.10	28.34	-82.44
informal_loan	-1.96	0.30	-2.26
better_financial	-5.37	2.62	-7.99
Agri	-1.02	-0.43	-0.59
member_elder	-1.79	-1.44	-0.35
member_child	-0.06	-0.33	0.27
OwnedHouse	20.62	1.42	19.20
municipal	21.93	-0.27	22.20
center	3.76	1.21	2.54
north	-1.69	-2.05	0.36
esan	-1.16	-4.63	3.46
south	-0.62	-0.39	-0.23
Subtotal	78.71	183.04	-104.33
Summary of decomposition results (as %)			
Amount attributable	78.71		
'- due to endowments [E]	183.04		
'- due to coefficients [C]	-104.33		
Shift coefficient [I]	252.42		
Raw differential [T=E+C+I]	331.12		
Adjusted differential [D=C+I]	148.08		
Endowment as % total [E/T]	55.28		
Discrimination as % total [D/T]	44.72		

Source: Author's calculation

Table 6: Decomposition Result of Saving differential between Low-Income Government Employees (LowGOV) and Low-Income Private Employees (LowPRI)

Variable	Amount Attributable	Amount Attributable to Endowments (E)	Amount Attributable to Coefficients (C)
ageZ	-14.42	44.56	-58.99
agesqrZ	25.87	-42.22	68.09
GenY	-6.94	4.41	-11.35
female	-10.12	0.62	-10.74
married	-17.60	0.00	-17.60
tincomeZ	35.94	37.34	-1.40
income_gov	6.90	-0.11	7.01
income_asset	1.12	5.23	-4.11
schoolZ	17.32	3.70	13.62
saving8	54.83	55.59	-0.76
OldAge	32.56	70.69	-38.13
precautionary	-36.17	39.24	-75.40
informal_loan	-2.79	-0.09	-2.70
better_financial	-6.59	3.44	-10.03
Agri	-0.42	-1.02	0.60
member_elder	-6.34	-2.15	-4.18
member_child	1.21	0.07	1.14
OwnedHouse	16.19	4.17	12.02
municipal	28.88	1.90	26.99
center	9.63	2.86	6.78
north	-1.24	-1.45	0.21
esan	-8.57	-8.81	0.24
south	-2.97	0.06	-3.03
Subtotal	116.29	218.02	-101.73
Summary of decomposition results (as %)			
Amount attributable	116.29		
'- due to endowments [E]	218.02		
'- due to coefficients [C]	-101.73		
Shift coefficient [I]	276.49		
Raw differential [T=E+C+U]	392.78		
Adjusted differential [D=C+U]	174.76		
Endowment as % total [E/T]	55.51		
Discrimination as % total [D/T]	44.49		

Source: Author's calculation

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