



Does the Employees Provident Fund Provide Adequate Retirement Incomes to Employees?

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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ABSTRACT

The objective of this study is to delve further the Malaysia's Employees Provident Fund (EPF) scheme by exploring the perceptions of 300 existing and prospective retirees in total on the existing EPF system that provides them with the adequacy of incomes in retirement. By employing the logistic model in this study, the perceptions of 250 retirees and 50 currently working employees, in particular, were evaluated as part of the overall assessment on the strategic pathway of the EPF system towards becoming the reliable financial security guarantor for elderly workers. Among others, there are relatively similar results regarding key factors to have substantial effects on the retirement income adequacy being prevailed in the cases of existing retirees and prospective retirees. Key factors namely the number of dependent persons, averaged non-EPF savings, housing loan, car loan and medical expense are found to be negatively related to retirement income adequacy. Therefore, necessary improvements on the existing EPF scheme need to be implemented so that the provision on accumulated financial resources of both existing and prospective retirees aimed at ascertaining appropriate adequacy levels in retirement incomes can be monitored in a timely manner.

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1. INTRODUCTION

The Employment Provident Fund (EPF) is one of the main employer pension scheme established by the Malaysian government to assist retirees by having minimum financial sources to adequately live in retirement [1]. In particular, the EPF represents Malaysia's retirement funds mainly for private sector employees. Intentionally, the EPF's establishment is to provide a compulsory savings scheme that aims to protect the employees' right to retirement savings besides enhancing the value of their savings for post-employment financial security and well-being. Over time, the original intention of EPF has significantly evolved to meet rising needs of the society at present and in the future, as evidenced from the recently enacted EPF pre-withdrawals policy in-place that includes investing in mutual funds, purchasing a house and financing higher education [1].

Basically, there are some specific objectives of the EPF's establishment in Malaysia. Of the important objectives, one is to ensure that the retirees would have adequate retirement financial sources or income to satisfy their basic needs and to maintain their living standards that they experienced before retirement. Undoubtedly, the adequacy of financial resources available for retirement constitutes an important factor in influencing an individual's decision to retire. According to Li, Montalto and Geistfeld [2], the adequacy of retirement income enables individuals to retire as planned and to maintain their desired levels of living standards in retirement. On the contrary, the inadequacy of retirement income may likely to necessitate the postponement of retirement or the reduction in the levels of living standards in retirement. More importantly, the EPF has been established thus far to protect the retirees from uncertainties in life such as the possibility that one will live longer than expected and prematurely use up all the assets accumulated for retirement. Thus, both short-term phenomenon e.g. unemployment and minor sickness, as well as long-term phenomenon e.g. death, retirement and incapacitation due to accident, sickness and disease, are well-covered under the EPF scheme.

The EPF's establishment ties up the benefits to the contribution of an individual. Through the EPF, an individual makes a contribution via

payrolls during employment and he or she is eligible for payments based on his or her contribution upon retirement. Under the Malaysia's EPF system, every employee needs to contribute 10 percent whereas an employer has to contribute 90 percent to the fund [1]. Direct deduction from the payslip will be handled by the employer and the employee's portion will be subsequently transferred by the employer to the government. The deduction of employee's salary for the EPF will be accordingly arranged until the date of pension. However, each employee is entitled to make pre-retirement withdrawals from the EPF's second account. Potentially, the final amount of payment to be received by a worker at retirement will be based on the chosen retirement plan, work history and retirement age plus its associated formula, respectively.

Because of the changes in the demographic factors, the structure and coverage of EPF have accordingly changed over time to accommodate the workers in old age. With the EPF's establishment, this indicates that the financial and social conditions of existing and future retirees have never been taken for granted among the government and public policy makers alike. In many cases, individual employees, who are approaching the retirement age of 58 and 60 years, tend to become worried since they do not have adequate retirement incomes as a result of the demographic and financial changes that affect the EPF scheme. Given the total amount of EPF money to be received by prospective retirees is not indexed to inflation, does this provide the adequacy of retirement income to a retiree? On this concern, Butrica, Smith and Iams [3] projected in their works that only about six percent of workers in their 40s and 50s would have future retirement incomes below the poverty threshold. Meanwhile, Munnell, Hou and Webb [4] indicated that about half of working households in the United States were seen at risk of failing to maintain their living standards in retirement. Further, Alaudin, Ismail and Isa [5] revealed that 69 percent of Malaysian households in the sample is found to have adequate retirement incomes. Thus, to comfortably live in retirement, it is anticipated that an individual will need 70 percent or more of pre-retirement earnings (Social Security Administration [6]).

Apart from that, an elderly worker may have the possibility to confront with different types of

shocks in retirement. Such shocks include major illness of self or spouse, loss of a spouse through death or divorce, serious disability or dementia of self or spouse and unusual longevity. In this context, the issue of retirement income adequacy to retirees is imperative and should be considered as a critical element in the establishment of pension schemes. Therefore, this study is aimed to delve further the EPF scheme by evaluating various perceptions of existing and prospective retirees in Malaysia on the currently administered EPF system. Strategically, the EPF system is seen on its pathway to become the preferred financial security guarantor for the workers in old age via providing them with the adequacy of retirement incomes that are solely based on the fund.

In Malaysia, the EPF scheme is relatively similar to those of neighbouring countries; Indonesia, Singapore, Thailand and the Philippines. The schemes of these five countries are based on certain key assumptions [7]. First, policymakers rely on the rapid economic growth and the reduction in poverty level. Second, the policymakers regarded the schemes for the non-public sector component of the labor force as essentially a private concern for the families, communities and employers. Third, those countries lean towards the organic view of the relationship between the individual and the state. Yet, there is a long-standing issue on the EPF system whether it can provide sufficient financial resources to retirees despite that the EPF decreases and raises the return on capital, accordingly.

The rest of this paper is organized as follow. Section 2 covers the literature review on the retirement income adequacy and Section 3 discusses on the used methodology. While Section 4 reports on the results, Section 5 wraps up with the conclusion of the study.

2. LITERATURE REVIEW

Researchers have used varying angles and perspectives to define the adequacy of retirement income in different ways. Associated with Modigliani and Brumberg [8] as cited in Li et al. [2], the standard life-cycle hypothesis is commonly adopted to analyze household consumption and savings behaviour including savings for retirement. In general, researchers conclude that the life cycle hypothesis holds whereby the retirement wealth is defined as adequate if the total retirement income is equal

or greater than the total desired retirement consumption [9], [10]. Also, the hypothesis states that the accumulation of assets actively takes effect during an individual's work life to finance the consumption in retirement. Explicitly, this implies that a person will save while young and employed but consumes thereafter when old and retired [11] as cited in [5].

Of available methods that are employed to estimate the consumption in retirement, the most common one is a replacement rate. It is the percentage of pre-retirement income that reflects the desired consumption level in retirement. Duncan, Mitchell and Morgan [12], who adopted the retirement adequacy framework in their studies, used the replacement rates within the range between 70 percent and 90 percent based on a person's gross income in their calculation of hypothetical cases. Meanwhile, Palmer [13], who calculated the replacement rates via using the Consumer Expenditure Survey data, unfolded that the adequate replacement rates (based on one's gross income) were determined to be in the range of 65 percent and 85 percent varying by marital and employment status and income level, respectively.

Notwithstanding, other approaches are also employed to estimate the desirable retirement consumption (or needs). For example, this is evidenced from the works of Moore and Mitchell [14]. By using the Health and Retirement Study, they examined the adequacy of asset holdings among the people who are nearing to retirement. Under the assumption of consumption smoothing¹ over the lifetime, they projected asset growth, compared the projections with the needs and assessed the corresponding incomes of retired persons at aged 62 and 65, respectively. Overall, the findings of Moore and Mitchell [14] revealed that the majority of elderly households are found to be a failure in maintaining current levels of consumption into retirement without having to increase their retirement incomes. Accordingly, assets were projected to be over USD380,000 and additional savings of 16 percent of earnings per year were crucial for those aged 62 whereas assets were expected to be nearly USD 420,000 and additional savings of seven percent of earnings per

¹ Consumption smoothing indicates that an individual strives to maintain his or her consumption at a relatively stable level. While the individual borrows to finance consumption in the periods when consumption expenditure surpasses income, he or she tends to save in the periods when income surpasses consumption expenditure.

year were required for those aged 65. Here, one identified limitation from Moore and Mitchell [14] is that uniform assumptions were established by disallowing the variations in portfolio allocation patterns, retirement age, retirement consumption and income levels among elderly households.

Apart from that, the feasible methods such as the multivariate ordinary least squares (OLS) and logistic regression models are increasingly reliable in the analysis of retirement adequacy. Both Yuh [15] and Yuh et al. [10] used the 1995's Survey of Consumer Finances data to estimate the adequacy of retirement among the households in the United States, respectively. Based on the mean projection and current contribution rates, slightly more than half of households, i.e. 52 percent of the total sample, are found to be adequately prepared for retirement. On the used determinants, planned retirement age and household spending behaviours are proven to be significantly related to retirement wealth adequacy. Specifically, the regression results Yuh [15] reported that unmarried male, self-employed households with defined benefit pension plans, late pensioners, high-income earners and equity (e.g. stocks and shares) holders are found to be positively related to retirement wealth adequacy. However, determinants like households whose members were low-level workers (e.g. operators), rented house owners and excessive spenders are unveiled to be negatively related to retirement wealth adequacy. While non-financial assets such as housing wealth were considered in Yuh [15], Yuh et al. [10] and Yao, Hanna and Montalto [16] as resources of retirement income, Brady [17] claimed that housing wealth is insignificant resource to increase retirement income.

Alaudin et al. [5] studied on the determinants of retirement wealth adequacy in Malaysia. Based on the 2009's Malaysian Household Income Survey data covering 5,881 households in total, Alaudin et al. [5] determined the demographic and socioeconomic determinants of retirement wealth adequacy via employing the OLS and logistic regression models in the analysis. Among others, it is unveiled from the results of OLS model that Region 4 (Pulau Pinang, Selangor, Kuala Lumpur and Putrajaya), urban areas, married persons, college graduates, government servants, respondents aged 30–34 and annual income earners within RM 25,000 – RM 40,000 on average are found to be positively related to

retirement wealth adequacy. In contrast, the logistic model only reported that urban areas and single-typed female households are seen to be positively related to retirement wealth adequacy. Therefore, the government is recommended to push for an increment in the EPF contribution rate from the part of employers for the specific groups of rural households notably with lower education levels and job skills. Besides that, the affected households are suggested to plan their expenditure wisely so that they can prioritize more money on savings.

3. METHODOLOGY

3.1 Data and Sampling Method

In this study, a typical individual level analysis is undertaken. Primary data are collected using self-reported survey. Under a random sampling method, the questionnaires are individually distributed to 250 retired workers and 50 currently working employees from the private sector. Pertaining to the respondents, they are found to come from four different categories namely services, manufacturing, construction and others. By integrating two categories of respondents, potential findings can be accordingly compared.

Thus far, researchers have measured retirement income in various ways that are ranging from the Social Security benefits to broader measures of income that include Social Security. In this study, income is broadly defined and the respondents have been asked whether they are able to maintain their pre-retirement living standards in retirement years using the total lump sum EPF savings that they receive to be spent in each month. To gauge the adequacy of retirement income, key consideration is on the following bases; whether retirement income meets the basic needs for living and whether it allows retirees to maintain their pre-retirement living standards in retirement.

3.2 Model Specification and Method of Estimation

The binary response model is used to evaluate the perceptions of retired workers and currently working employees on the EPF scheme. Hence, the general form of the binary response model by Wooldridge [18] is shown in Equation (1):

Table 1. Definitions and expected signs of the independent variables

Variable	Definition	Expected sign	Past studies
Number of Dependent Persons (<i>DPDT</i>)	Larger household size may require sizeable financial resources needed in retirement. Thus, it would have a negative effect on the retirement income adequacy.	Negatively related to retirement income adequacy.	Montalto, Yuh and Hanna (2000); Alaudin, Ismail and Isa (2015)
Non-EPF Savings on Average (<i>ASVG</i>)	The ownership of assets may positively lead to having adequate financial resources for retirement. However, this proves to be otherwise for the case of holding the debts.	Positively or negatively related to retirement income adequacy	Li, Montalto and Geistfeld (1996); DeVaney and Chiremba (2005)
Housing Loan (<i>HGLN</i>)	A respondent is asked whether owns or rents the house where he or she currently lives (either 1 or 0).	Negatively related to retirement income adequacy.	DeVaney and Chiremba(2005); Ares, López and Búa (2015)
Car Loan (<i>CRLN</i>)	A respondent is asked whether owns or still refinance his or her car on a monthly basis (either 1 or 0).Within the literature, no car loan per se was used in the past studies but it is generally fits into the categories of assets and liabilities just like <i>ASVG</i> .	Negatively related to retirement income adequacy.	Li, Montalto and Geistfeld (1996)
Medical Expense (<i>MDEXP</i>)	A respondent is asked in term of total money (in RM) spent on medical expense in a month, thus causing less financial resources to be consumed by them in retirement.	Negatively related to retirement income adequacy.	Lum and Lightfoot (2003); Ares, López and Búa (2015)

$$P(y = 1|\mathbf{x}) = G(\beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \dots + \beta_kx_k) = G(\beta_0 + \mathbf{x}\boldsymbol{\beta}) \quad (1)$$

where G is a function that strictly takes on values between zero and one; $0 < G(z) < 1$, for all real numbers z . Thus, G is the logistic function in the logit model with the following expression as per Equation (2):

$$G(z) = \exp(z)/[1 + \exp(z)] = \Lambda(z) \quad (2)$$

Correspondingly, the logic model can be derived from an underlying latent variable model. Let y^* be the latent variable as provided in Equation (3):

$$y^* = \beta_0 + \mathbf{x}\boldsymbol{\beta} + \varepsilon, \quad y = 1[y^* > 0] \quad (3)$$

Suppose that the function of $1[\cdot]$ takes on the value one if the event in bracket is proven to be true and zero otherwise. From Equation (3), the response probability for y is subsequently expanded as per Equation (4):

$$\begin{aligned} P(y = 1|\mathbf{x}) &= P(y^* > 0|\mathbf{x}) \\ &= P[\varepsilon > -(\beta_0 + \mathbf{x}\boldsymbol{\beta})|\mathbf{x}] \\ &= 1 - G[-(\beta_0 + \mathbf{x}\boldsymbol{\beta})] = G(\beta_0 + \mathbf{x}\boldsymbol{\beta}) \end{aligned} \quad (4)$$

By substituting dependent and all independent variables of this study, Equation (4) can be rewritten as Equation (5):

$$\begin{aligned} P(\text{RETINC} = 1 | \text{DPDT}, \text{ASVG}, \text{HGLN}, \text{CRLN}, \\ \text{MDEXP}) \\ = G(\beta_0 + \beta_1\text{DPDT}_i + \beta_2\text{ASVG}_i + \beta_3\text{HGLN}_i + \\ \beta_4\text{CRLN}_i + \beta_5\text{MDEXP}_i) \end{aligned} \quad (5)$$

where $RETINC$ is a binary variable equal to one if a worker or a retiree opines that the retirement income is adequate or vice versa. Also, $DPDT$ is the number of dependent persons, $ASVG$ is averaged non-EPF savings, $HGLN$ is housing loan, $CRLN$ is car loan and $MDEXP$ is medical expense.

Since the logit model is considered as nonlinear binary response model, it can be estimated using maximum likelihood estimation (MLE).

3.3 Definitions and Measurements of the Variables

The details of used variables are encapsulated in the following sub-sections, accordingly.

3.3.1 Dependent variable

From Equation (5), retirement income ($RETINC$), which sits on the left hand side, is regarded as the dependent variable. It represents the dummy

variable coded as one if a worker or retiree opines that there is an income adequacy to comfortably live in retirement or zero otherwise. Thus far, there exist previous studies that used retirement income or related indicator as the dependent variable of their studies including Harris, Loundes and Webster [19], Lum and Lightfoot [20] and DeVaney and Chiremba [21].

3.3.2 Independent variables

Several factors on the right hand side in Equation (5) were determined to have the potential to affect the adequacy of financial incomes that are solely-based on the EPF among the existing and prospective retirees in retirement, respectively. Hence, Table 1 contains the detailed descriptions on the definition of these independent variables and the expected sign of every variable. Despite the signs were pre-determined in this study, their potential signs may subsequently turn out otherwise.

4. DISCUSSION OF RESULTS

From the questionnaires submitted by a total of 300 EPF member respondents; 250 existing retirees and 50 prospective retirees, the adequacy of retirement incomes solely-based on the EPF can be evaluated thereafter. Specifically, the estimation on the EPF adequacy in retirement is based on the two underlying bases i.e. whether retirement incomes meet the basic living needs and whether retirement incomes allow retirees to maintain the pre-retirement living standards. Accordingly, the results for 250 existing retiree respondents are shown in Table 2.

Table 2 shows that the logit model of retirement income ($RETINC$), which directly reflects the EPF adequacy, is regressed on key factors notably dependent persons ($DPDT$), average non-EPF savings ($ASVG$), housing loan ($HGLN$), car loan ($CRLN$) and medical expense ($MDEXP$). On the results of this study, all variables including a constant term are proven to be statistically significant at the five percent and 10 percent significance levels, respectively. Also, the variables are found to be negatively related to $RETINC$. Ceteris paribus, there is a 0.3 percent decline in the composition of retirement income in conjunction with a percent increase in the number of dependent persons within a family. Due to the larger size of a household, the greater the financial needs are required thus, causing elderly workers to have inadequate incomes

Table 2. Results on the evidence of EPF adequacy among existing Retiree respondents

Variable	Coefficient	Standard error	t-statistic	p-value
Dependent variable: RETINC				
C	-1.609	0.387	-4.156	0.000*
DPDT	-0.308	0.097	-3.180	0.002*
ASVG	-3.190 x 10 ⁻⁵	1.430 x 10 ⁻⁵	-2.232	0.026*
HGLN	-0.714	0.213	-3.345	0.001*
CRLN	-0.519	0.205	-2.524	0.012*
MDEXP	-0.031	0.017	-1.825	0.068**
McFadden R-Squared	0.341	Prob (LR Statistic)		0.064
Obs with Dep = 0	232	Total Obs		250
Obs with Dep = 1	18			

Note: * and ** indicate $H_0: \beta_i = 0$ being rejected at the five percent and 10 percent significance levels, respectively.

available for retirement. Therefore, this finding seems harmonious with Montalto, Yuh and Hanna [22] who unveiled that the size of a household is positively associated with the planned retirement age.

Likewise, there are potential reductions in the retirement income volume by about 0.7 percent, 0.5 percent, 0.03 percent and (-3.2 x 10⁻⁵) percent or seemingly negligible amount due to increments of a percent in various commitments per month on housing, personal vehicles, medical expense and non-EPF savings (e.g. Tabung Haji and insurance-related schemes) on average, accordingly. Of the factors, home ownership is considered as the largest spending item for many existing retirees. Albeit the portion is unlikely to be subtracted from their out-of-pocket spending, sizeable shares out of retirement incomes solely-based on the EPF are attributed to the act of paying installments on home ownership by retirees in retirement throughout a month. Equally important, another major portion out of the retirement incomes among the retirees is associated with the medical and health care expenditure. This is a normal scenario since maintaining the good state of health is the utmost priority among the workers in old age. With such evidences are expected to take place, it is reckoned that there would result in the availability of inadequate incomes to be conservatively spent by elderly workers in retirement. In this regard, the EPF is foreseen to be no longer sustainable as a lifetime financial guarantor. Inevitably, they will live in poverty exacerbated by the absence of other financial supports in-place.

Among others, the results of this study are aligned with Yusuf, Ali and Yusoff [23] who asserted that the more frequent pre-retirement

withdrawals, e.g. for housing, medical and education, were allowed during the employment, the lower their levels of replacement rate, which feasibly indicated by varying levels of retirement income earned by a pensioner, would likely to be upon reaching the retirement. Therefore, Yusuf et al. [23] suggested that the amount saved in the retirement income needs to be reasonably larger in consideration of the lump sum amount received upon reaching the retirement that has to be prolonged for many years to support their daily expenses.

When looking into the overall goodness of fit on the model in Table 2, the R^2 value of 34.1 percent means that about 34 percent of the variations in retirement income can be significantly explained by explanatory variables in the model. Apart from that, the LR-statistic, which determines the joint statistical influence between explanatory variables and retirement income, is proven to be statistically significant at the 10 percent significance level.

Likewise, another set of survey was also conducted involving a total of 50 prospective retiree respondents. As such, the associated results are exhibited in Table 3.

Similar to the case of existing retiree respondents, the logit model of retirement income in Table 3 is regressed on the independent variables; dependent persons, average non-EPF savings, housing loan, car loan and medical expense. It is observed that all variables excluding a constant term are verified to be statistically significant against *RETINC* at the significance levels of five percent and 10 percent, respectively. Also, the variables are found to have negative relationships with the variations in retirement

Table 3. Results on the evidence of EPF adequacy among prospective retiree respondents

Variable	Coefficient	Standard Error	t-statistic	p-value
Dependent Variable: RETINC				
C	-0.434	0.956	-0.454	0.650
DPDT	-0.398	0.103	-3.851	0.000*
ASVG	-4.310 x 10 ⁻⁵	2.340 x 10 ⁻⁵	-1.844	0.065**
HGLN	-1.609	0.775	-2.078	0.038*
CRLN	-2.489	1.371	1.816	0.069**
MDEXP	-0.003	0.002	-1.785	0.074**
McFadden R-Squared	0.225	Prob (LR Statistic)		0.083
Obs with Dep = 0	42	Total Obs		50
Obs with Dep = 1	8			

Note: * and ** indicate $H_0: \beta_i = 0$ being rejected at the five percent and 10 percent significance levels, respectively.

incomes among the prospective retiree respondents.

With regard to the number of dependent persons, the results of this study indicate that there is a reduction of about 0.4 percent in the formation of retirement income in line with a percent rise in the number of dependent persons in a household. To put it simply, the larger the household size expands, the lesser the retirement income adequacy becomes.

In this respect, this finding conforms to Alaudin, Ismail and Isa [24] who discovered that the decrease in wealth-need ratio is in line with the increase in household size, thus implying that the retirement adequacy is lower for the larger sizes of household in the sample.

Equivalently, there are expected decreases in the volume of retirement income by about 2.5 percent, 1.6 percent, 0.003 percent and (4.3 x 10⁻⁵) percent or considerably insignificant amount as a result of inevitable increases by one percent in the monthly commitments of car loan, housing loan, medical expense and averaged non-EPF savings, respectively. By having many attributes relatively match with the case of existing retiree respondents as per Table 2, the results on prospective retiree proponents in Table 3 unfold that there is an evidence of inadequate EPF solely-based to be faced by retirees, both existing and prospective, in retirement as strongly underpinned by insufficient amount saved in the retirement funds.

Overall, the results of this study are seen to be parallel with Yusuf et al. [23] who stressed that the likelihood of an EPF member being exposed

to the risk of having inadequate income at retirement if the amount in the fund is improperly managed due to the availability of pre-retirement withdrawals. More importantly, the value of a monthly payment being paid beyond five years in the post-retirement was evaluated to be within the poverty level and incapable of reaching the minimum replacement rate level [25].

Similar to the logit model of retirement income for a group of retirees in Table 2, the overall goodness of fit on the model for a group of currently working employees in Table 3 is investigated through the interpretation of results on R² and LR statistic values. Accordingly, the logit model of retirement income for a group of 50 prospective retiree respondents in Table 3 is relatively less fitted model with only about 23 percent of the variations in retirement income that can be significantly explained by explanatory variables in the model. Also, the value of LR-statistic signifies that the joint statistical influence between explanatory variables and retirement income is verified to be statistically significant at the 10 percent significance level.

5. POLICY IMPLICATION AND CONCLUSION

This study employed the logistic regression model in order to evaluate various perceptions of 300 existing and prospective retirees in Malaysia on the currently administered EPF system in the country. With the use of the logistic model in this study, the perceptions among retirees were potentially evaluated with regard to the strategic move of the EPF system to become the financial security guarantor for the workers in old age via providing them with the adequacy of

retirement incomes that are solely based on the fund.

On the findings of this study, it is revealed from the case of existing retiree respondents in Table 2 that all variables; the number of dependent persons, averaged non-EPF savings, housing loan, car loan and medical expense are found to be statistically significant at the five percent and 10 percent significance levels, respectively, but the variables are negatively related to the formation of retirement income adequacy. Likewise, the disclosure of findings for the case of prospective retiree respondents in Table 3 indicates that the number of dependent persons, averaged non-EPF savings, housing loan, car loan and medical expense are statistically significant at the five percent and 10 percent significance levels, respectively, but the variables are negatively related to retirement income adequacy. Hence, it is worth to note that the understudied variables namely the number of dependent persons, averaged non-EPF savings, housing loan, car loan and medical expense represent key factors that have substantial effects on the adequacy of retirement incomes, accordingly. If the prevailing effects are conceivably severe, there is the likelihood that a retiree to have inadequate financial resources that may result in decreasing the living standards in retirement relative to the pre-retirement living standards or may necessitate him or her for making a re-entry move to the labour force.

Based on the findings of this study, necessary improvements on the existing EPF scheme need to be implemented so that the provision on accumulated financial resources of both existing and prospective retirees aimed at ascertaining appropriate adequacy levels in retirement incomes can be monitored in a timely manner. By doing so, this leads to improving the income adequacy over considerable numbers of years given an elderly worker decides to go for retirement. In the meantime, immediate actions are expected to come from the prospective retirees in carefully and ambitiously planning for their retirement. With the proper guidance from retirement counsellors and financial planners, they can realistically develop financial strategies in order to yield ample financial resources for retirement.

Apart from that, the government is suggested to develop policy responses that would induce individuals who strongly desire to increase

additional savings available for retirement. Feasibly, this can be realized through a robust promotion of more labour force participation from the workers in old age besides encouraging higher levels of private savings, both within and beyond the EPF system. As a result, a future dependence on the public pension is optimistically foreseen to be reduced in a gradual manner.

Additionally, the government is recommended to structurally redesign or repackage the existing private pension plans so that the newly private-based plans are well-suited to become an integral part of the nation's social and financial security system that exclusively acts as the welfare provider for elderly workers. Under the newly private-based plans, appealing incentives in terms of sufficiently high contribution rates notably from the employers' side are proposed to be rewarded to the economically disadvantaged workers in old age who are committed to render their services for considerably long periods of working years. Also, the educational programmes can help these workers to better plan for their retirement and make informed decisions on the voluntary private pension savings [26]. Fittingly, such policies can represent the most effective way as means to improve the chances of elderly workers in obtaining an adequate replacement rate from the EPF and address the differences in saving needs if properly targeted to particular subgroups of the population.

Holistically, in maintaining the long-term sustainability of the EPF system, it is expected that some effective mechanisms in-place to formidably support the existing and prospective retirees in securing the acquisition of sufficient financial resources for retirement. Hence, the treat or collapse of a system, if any generation fails to maintain it, is sufficient to sustain it [27].

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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