

# Are There Adequate Benefits and Contributions for SOCSO's Invalidity Pension Scheme (IPS)?

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Social security is a protection that a country legally gives to its citizens against interruption, death and loss of income. There are two kinds of protection schemes SOCSO in Malaysia, namely the Employment Injury Scheme (EIS) and the Invalidity Pension Scheme (IPS). This article aims to determine the benefits and contributions of IPS using Actuarial Cost method. In addition, this result will be used to compare with the adequacy of SOCSO contribution rate. Data of number of active populations in year 2014 for Invalidity Pension and Survivors' Benefit are obtained from Social Security Organisation (SOCSO). The findings concluded that the claim made on benefits is higher than the contribution. This can lead to inadequate for benefits as compared to contributions.

**Keywords:** benefit; contribution; invalidity pension scheme

## I. INTRODUCTION

The social security system in Malaysia is made up of two main organisations major which are Employees Provident Fund (EPF) and Social Security Organisation (SOCSO). The Social Security Organisation (SOCSO) of Malaysia was set up in 1971 under the Ministry of Human Resources (MOHR) to direct the social security plans under the Employees' Social Security Act, 1969 (Act 4), (Malaysia 1969)). According to Merican (2010), there are two types of social security schemes that SOCSO provided benefits to its members which are Employment Injury Scheme (EIS) and Invalidity Pension Scheme (IPS). EIS is set up for work-related injuries or illnesses where the financial burden of which is taken exclusively by managers while IPS is primarily for the security of employment which is distributed between the managers and members of the seriously disabled person associated to work. A more detailed discussion on the issues of EIS and IPS under SOCSO in Malaysia can be found in Jamil & Wei (2015), Sim & Hamid (2010) and Samsuddin & Ismail (2015).

This article only focuses on Invalidity Pension Scheme (IPS). Under this plan, employees can be qualified for

benefits such as Invalidity Pension, Invalidity Grant, Constant Attendance Allowance, Survivors' Pension, Funeral Benefit, Rehabilitation Benefit and Education Benefit. In this article, only two benefits will be used to determine the amount of benefits and contributions which are Invalidity Pension and Survivors' Pension.

An Invalidity Pension is one of the benefits provided under IPS scheme where it is payable to an employee who suffer from permanent invalidity and has complied with certain contribution provisions that make him or her incapable of participating in a significantly profitable occupation (Awang Chek *et al.*, 2018). Employees shall be deemed to have met the full contribution period if their monthly contribution over the previous 40 months or contributions over a period of at least two thirds of their period of entry for at least 24 months was paid. In the full qualifying period, the invalidity pension rate is 50% of the reference income up 1% for each 12 contribution months reaching 24 and rising to a limit of 65%. The average salary for the last 24 months is the reference salary (Merican, 2010; Zhang & Sha 2019). According to International Labour Organisation (2017), a severe disability or chronic illness which is incurable or not likely to be healed should occur before age 60. In contrast,

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Merican (2010) stated that the pension of invalidity shall not apply to persons over 55 as stated under Employees' Social Security Act, 1969. Employees shall be deemed to have met the full contribution period if their monthly contribution over the previous 40 months or contributions over a period of at least two thirds of their period of entry for at least 24 months was paid. In the full qualifying period, the invalidity pension rate is 50% of the reference income up 1% for each 12 contribution months reaching 24 and rising to a limit of 65%. The average salary for the last 24 months is the reference salary (Merican, 2010; Zhang & Sha 2019).

For Survivors' Pension, it is a primary or secondary dependency of the employees who dies from any incident after receipt of the IPS shall be payable, or who decease from any case before reaching age 60 years (International Labour Organisation, 2017; Sim & Hamid 2010). As mentioned by Awang Chek *et al.* (2018), it must have fulfilled the states of eligible number of contribution either "full pension" or "reduced pension" conditions at any rate 2 years' constant contribution in no more than 40 months and the modeling of survivors benefit greatly utilize of the family model presumption. The survivors' pension benefit has been increases from RM250 to RM475 per month as of 1<sup>st</sup> January 2012 since the last actuarial valuation (International Labour Organisation, 2017). In addition, Iyer (1999) stated that the pensions of the beneficiary shall be granted to designated dependents who are mostly widows, widowers and orphans, subject to the condition that either the deceased insured person had requested the pension on the date of death or had already received the retirement or invalidity pension. The widow may have to satisfy more requirements such as a minimum age, and an individual with a disability or having the care for small children. The pension of the orphan is terminated at a specified age or it may extend under some circumstances such as if they pursue their study in a full time or they are handicapped.

From the claims of the benefit made by employees, there is an increment in SOCSO's expenditure related to health problems. This increment has become one of the biggest problems over time and can cause negative impacts on the economic growth of the country. It is currently estimated that SOCSO's expenditure exceeds its contribution rate of 60% of SOCSO's revenues (International Labour

Organisation, 2017). According to Jamil & Wei (2015), the spending on benefits increased by 10% to RM 2,222.74 million compared to RM 2,020.62 million in 2012. It could be a problem for the company if current trends continue. This statement is also supported by Zhang & Sha (2019) where the largest government allocation in 2017 was spending on social security. As SOCSO's expenditure has increased year by year, employee still make a claim due to the financial concerns. Sim & Hamid (2010) mentioned that annual amount of contribution for SOCSO' IPS is approximately RM1.8 billion with a higher payout amount of RM1.13 billion. They also said that the sustainability problem will lead to the issue of adequacy of fund for SOCSO' IPS and this sustainability problem arises since the pay-out amounts to approximately 80% of contributions received and has stayed the same over the years, whilst the pay-out has been growing. In addition, Mohd (2009) stated that the cost of healthcare will continue to increase due to inflation and the effects of an ageing population. Therefore, in order for the fund to give sufficient pay-out to the participant to the benefits protection, the fund itself must be sufficient and adequate. If there is no action to do in order to make sure the fund is adequate and sufficient, invalidity fund would become depleted (International Labour Organisation, 2017).

Based on those problems of SOCSO's contribution rate, the objective of this study is to calculate the contribution amount of Invalidity Pension Scheme based on Invalidity Pension and Survivors' Pension. So, in order to calculate the contribution amount, benefits paid by SOCSO will be divided by contributions made by employers and employees. The concept is similar with net annual premium formula. According to Slud (2012), premium is the expected present value of annuity, life insurance, or endowment contract proceeds divided by the expected present value of a unit amount paid regularly, based on the predefined payment pattern, until death or termination of term. So, in this study, we consider a term life policy divided by the series of contributions made by the employee.

## II. MATERIALS AND METHOD

In this study, the sample data for Invalidity Benefit and Survivors' Benefit was obtained from SOCSO for the year

2014. The variables provided in those benefits are gender, date of birth, date of disability, date of claimant and benefit amount in the form of yearly data. A total of 16,696 claims that relate to invalidity pension and survivor's pension by contributors is from aged of 27 to 60.

To determine the benefits and contributions of IPS, Actuarial Cost method (ACM) will be used. This model has been applied in pension studies such as Munnell, A. *et al.* (2011) who used the ACM to examines the current funding of state and local pension plans and Adeyele, J. S., & Ogunbenle G.M. (2011) in determining the accruing pension liabilities using actuarial modeling under the defined benefit to provide guidelines on how to defray the total liabilities. ACM is a procedure for allocating to periods the actuarial present value (APV) of future plan benefit costs. The two main methods used to calculate the payments are the benefit approach and the cost approach. The benefit approach calculates the benefits that the employees have already received based on the length of their employment while the cost approach calculates the amount that the company has to raise periodically in order to pay future benefits. APV means that the value as of a specified date of an amount or a series of amounts due before or thereafter, where each amount is multiplied by the probability that the condition on which payment of the amount is contingent will be satisfied, and where each amount is increased (if due before) or discounted (if due thereafter) according to an assumed rate of interest to reflect the time value of money. Computing an APV requires using actuarial assumptions to adjust accumulated plan benefits to reflect the time value of money, (Crosson, 1979). The assumptions as below are needed:

a. Entry Age

In current system, usually people get an entry level job right after graduate with degree holder which is at aged 25. This showed that range of entry age which is 25 and below is in the familiarizing stage in adapting to organisation work processes and culture (Khalid *et al.*, 2011). Thus, this study will assume the entry age for worker is at age 25 which a year after graduated.

b. Salary

Based on Anon (2014) the initial salary of RM2500 is adequate for fresh graduates who are joining the workforce as long as they are well-managed and live within their own limits. Thus, this study will assume the fresh graduates' starting monthly salary is RM2,500. Based on Chow *et al.* (2015), SOCSO schemes cover employees earning less than RM4,000 a month and financed by both staff and employers' contributions.

c. Interest Rate

Bank Negara Malaysia's Monetary Policy Committee (MPC) specified that an Overnight Policy Rate (OPR) of 3% is applied when determining the interest rate (Anon. 2019).

d. Salary Increment

Chin (2018)) stated that average wage and salary in Malaysia raised an average rate of 5.2% in 2019.

e. Dependants

For dependants, assumed that dependants will receive the highest daily rate in Survivors' Pension which is widow or widowers in this research. According to PERKESO (2020), widows or widowers will receive 3/5 of daily rate of Survivors' Pension which is higher than child based on priorities in the family. Furthermore, it is also assumed that age of participant is same with dependant's age during claim.

f. Maximum Age

New mortality life table for the period of 2011 to 2015 will be used, (Actuarial Partners 2018). The maximum age in the mortality life table is at age 99. Thus, this research assumes the maximum age for population in Malaysia is 99 years old and the maximum age for workers in Malaysia is at age 69. This is because the number of populations of active workers provided by report from ILO is up to 69 years old.

g. Number of Contribution Paid

The qualifying criteria for full contribution systems mean a minimum of 24 contributions from the preceding of 40 months, or not less than two-thirds of the total month between the first contribution payable period (Merican, 2010; PERKESO, 2020).

Let

e = Age of worker enter the scheme and start to contribute

x = Age of worker start to claim for benefits

r = Age of worker start to retire

v = Discount factor

j = Cause of decrement, where j can be assuming as follow:

1- Invalidity

2- Mortality for workers

3- Mortality for Malaysian

For Invalidity Pension,  $\tau$  - All causes of decrement (j=1,2)

For Survivors' Pension,  $\tau$  - All causes of decrement (j=3)

${}_t p_x^{(\tau)}$  = Probability of age (x) will survives until time t for all causes of decrement

${}_t q_x^{(j)}$  = Probability of age (x) will die with cause of j decrement before time t

$\ddot{a}_x$  = Annuity payment for benefit paid at the beginning of year

NC = Contribution number (number of years of service)

APV(B) = Actuarial Present Value for Benefit

$\bar{A}_{e:60-e|}^1$  = Actuarial Present Value function

B = Benefit function

S = Salary function

The general formula for Actuarial Present Value (APV) of benefit is:

$$\bar{A}_{e:60-e|}^1 = \int_0^{60-e} v^t {}_t p_x \mu_{x+t}^j dt \quad (1)$$

where discount rate is:

$$\text{discount rate, } v^t = \frac{1}{(1+i)^t}$$

$${}_t p_x^{(\tau)} = 1 - {}_t q_x^{(\tau)}$$

$$\mu_{x+t}^j = \frac{q_x^{(j)}}{{}_t p_x^{(\tau)}}$$

Thus, the expansion of formula of Actuarial Present Value (APV) is:

$$\bar{A}_{e:60-e|}^1 = \int_0^{60-e} v^t (1 - {}_t q_x^{(\tau)}) \left( \frac{q_x^{(j)}}{1 - {}_t q_x^{(\tau)}} \right) dt \quad (2)$$

Full Qualifying Period:

$$\text{Percentage of salary (\%)} = \left( \frac{NC-24}{12} \right) \% + 50\%$$

$$NC = (x - e) * 12$$

$$S = 2500(1 + s)^{x-e} \text{ where basic starting salary is}$$

$$\text{equal to RM2,500}$$

A. Invalidity Pension

Let

$$\omega = \text{Maximum age which is 69}$$

For Invalidity Pension, estimating the APV can expressed as follows:

$$APV(B) = B * \bar{A}_{e:60-e|}^1 \quad (3)$$

$$\bar{A}_{e:60-e|}^1 = \int_0^{60-e} v^t q_x^{(1)} dt \quad (4)$$

where

If benefit per month < RM 475, the employee will get RM475 benefit per month:

$$B = S * 12 * \% * \ddot{a}_x$$

$$\ddot{a}_x = \sum_{k=0}^{69-x-1} v^k {}_k p_x^{(\tau)}$$

$${}_k p_x^{(\tau)} = 1 - k * q_x^{(\tau)}$$

$$q_x^{(\tau)} = q_x^{(1)} + q_x^{(2)},$$

for

1=invalidity

2 = mortality

$\tau$  = All causes of decrement

B. Survivors' Pension

Let

$$\omega = \text{Maximum age which is 99}$$

For Survivors' Pension, estimating the APV can expressed as follows:

$$APV(B) = B * \bar{A}_{e:60-e|}^1 \quad (5)$$

$$\bar{A}_{e:60-e|}^1 = \int_0^{60-e} v^t q_x^{(2)} dt \quad (6)$$

where

If benefit per month < RM 475, the employee will get RM475 benefit per month:

Daily rate = Highest rate 0.6; Widow/widower

$$B = \frac{S}{30} * \text{daily rate} * 365 * \% * \ddot{a}_x$$

$$\ddot{a}_x = \sum_{k=0}^{99-x-1} v^k {}_k p_x^{(\tau)}$$

$${}_k p_x^{(\tau)} = 1 - k * q_x^{(\tau)}$$

$$q_x^{(\tau)} = q_x^{(2)},$$

for

2=mortality

C. Contribution Formulation

The contribution function for every benefit is equal to,

$$C = \frac{APV(B)}{\bar{a}_{e:x-e|}} \quad (7)$$

where

$$\bar{a}_{e:\overline{x-e}|} = \int_0^{x-e} v^t {}_tP_x^{\tau} dt$$

$${}_tP_x^{(\tau)} = 1 - t * q_x^{(\tau)}$$

$$q_x^{(\tau)} = q_x^{(1)} + q_x^{(2)}$$

for

1=invalidity

2 = mortality

$\tau$  = All causes of decrement

### III. RESULT AND DISCUSSION

Figure 1 shows the amount of Invalidity Pension's benefit and contribution for male. The highest recipient who received this benefit and contribution is at the aged of 53 which is RM 28,540,229.50 and RM 1,625,940.55 respectively. This is because there are 607 out of 9953 male recipients at the aged of 53 which is the highest number for Invalidity Pension. Moreover, the least amount of Invalidity Pension benefit for male is RM 233,700.00 at the aged of 27 because it also has the least number of male recipients. However, the least amount of Invalidity Pension contribution for male is at the age of 33 which is RM 70,619.12.

Figure 2 shows that the amount of Invalidity Pension's benefit for female. Recipients at the aged of 55 are the highest age who received this benefit and contribution with the amount of RM 21,612,931.20 and RM 1,188,409.60, respectively. The reason it, there are 448 out of 6743 female recipients at the age of 55 which is the highest number for Invalidity Pension. Besides, the least amount of both Invalidity Pension benefit and contribution for female are at the age of 29 which are RM 188100.00 and RM 49883.46 due to the least number of female recipients.

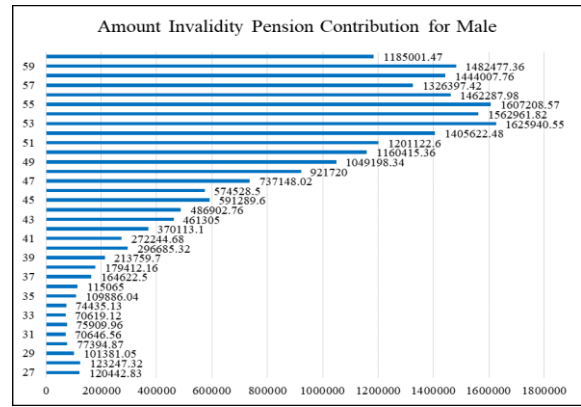


Figure 1. Amount of Invalidity Pension Benefit and Contribution for Male

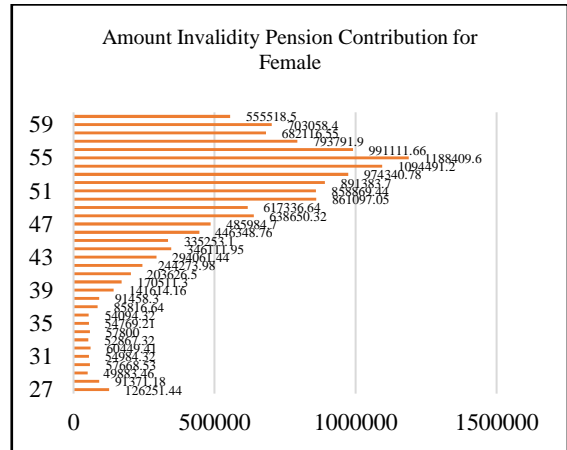
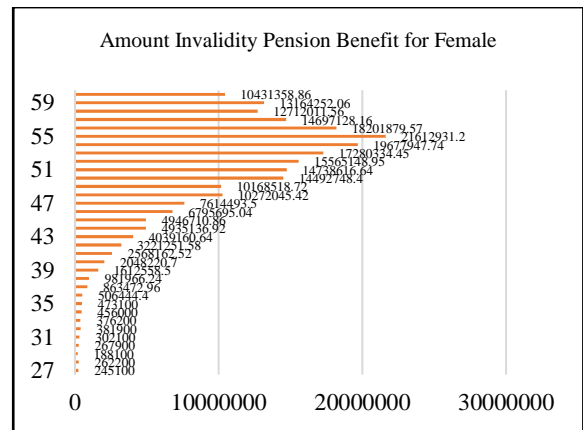
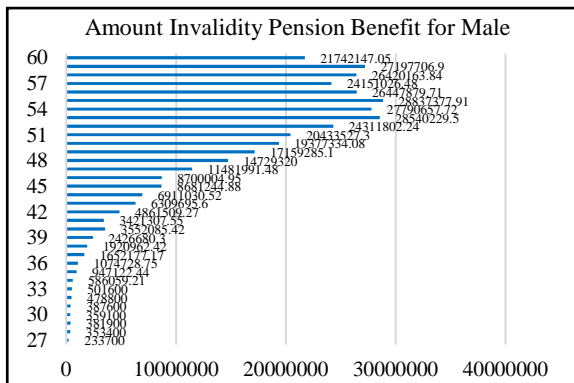


Figure 2. Amount of Invalidity Pension Benefit and Contribution for Female



For Survivors' Pension benefit and contribution, Figure 3 and 4 shows the results for male and female. From the Figure 3, the maximum amount of Survivors' Pension benefit for male in is RM 3,934,679.48 which is at the age of 58 and the highest amount of Survivors' Pension contribution for male is at the age of 56 which is RM 215,653.23. However, the number of Survivors' Pension recipients for male is the highest at the age of 55 which is 333 recipients. Moreover, the least amount of Survivors'

Pension benefit for male is RM 353,400.00 at the age of 27 because it also has the least number of male recipients. However, the least amount of Survivors' Pension contribution for male is at the age of 33 which is RM 63,396.71.

Figure 4 shows that the highest amount of Survivors' Pension benefits for female which is RM 558,600.00 at the age of 52 while amount of Survivors' Pension contribution is at the age of 27 with the value of RM 64,593.76. However, the highest amount of Survivors' Pension recipients for female is at the age of 52 with 98 recipients. Furthermore, the least amount of Survivors' Pension benefit for female is RM 125,400.00 at the age of 27 because it also has the least number of female recipients. However, the lowest amount of Survivors' Pension contribution for female is at the age of 60 which is RM 13,356.20.

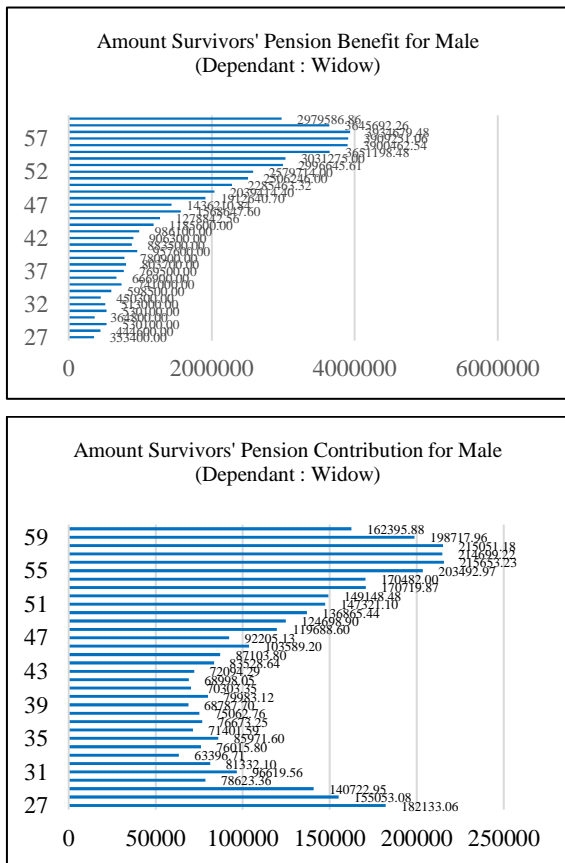


Figure 3. Amount of Survivors' Pension Benefit and Contribution for Male with Widow as Dependent

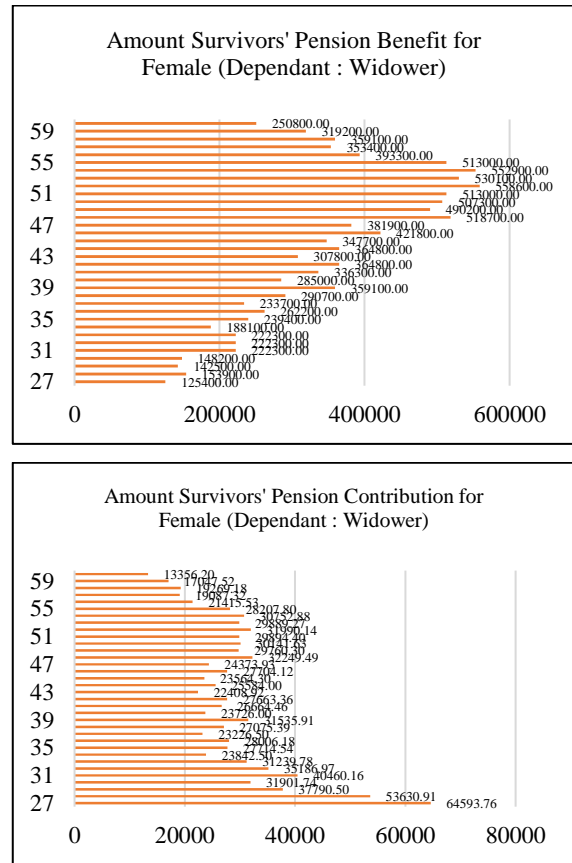


Figure 4. Amount of Survivors' Pension Benefit and Contribution for Female with Widower as Dependent

**IV. CONCLUSION**

This study focuses on workers in Malaysia who contribute under SOCSO's Invalidation Pension Scheme (IPS) and only two types of benefit is used which are Invalidation Pension and Survivors' Pension to calculate the benefit and contribution using actuarial approach. Therefore, from the findings it can be concluded that the claim made on benefits is higher than the contribution. This can lead to inadequate for benefits as compared to contributions.

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