ON THE STUDY OF MALAYSIA'S PRIVATE ANNUITY
(Kajian terhadap Anuiti Persendirian di Malaysia)

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ABSTRACT

Mortality improvement in many countries nowadays has drawn policymakers' attention towards providing a financially stable retirement scheme for retirees. In some countries like Chile and Switzerland, annuities are common and a successful product with a good retirement benefit. Private annuities specifically designed for Employees Provident Fund members were also introduced in the Malaysian market in 2000. Despite the high annuitisation rate during that time, this product was suspended by the government a year after. Objections towards the scheme included a belief that insurance companies may profit excessively from the scheme and it provided a lack of protection for contributors' retirement savings. Annuities have been almost non-existent since then. In a recent Malaysian Government Budget an increase in tax relief for income used to purchase annuities seems to promote the development of annuity markets in Malaysia. Until now, there has been a lack of proper analysis in Malaysia to help buyers understand the value of annuities, especially upon retirement. This study aims to calculate the value for money of Malaysia's private annuities by computing the Money's Worth Ratio (MWR) and the Annuity Equivalent Wealth (AEW) of the annuity component of recent products. This analysis will be used to evaluate whether Malaysian private annuities are worth buying.

Keywords: Malaysian annuity market; value for money; Money's Worth Ratio; Annuity Equivalent Wealth; annuities

ABSTRAK

Jangka hayat yang semakin meningkat di kebanyakan negara kini telah menarik perhatian penggubal dasar untuk menyediakan skim kewangan persaraan yang stabil untuk pesara. Di beberapa negara seperti Chile dan Switzerland, anuiti adalah produk yang tidak asing dan memberi faedah persaraan yang baik. Anuiti persendirian yang diperkenal khusus untuk ahli Kumpulan Wang Simpanan Pekerja juga diperkenalkan di pasaran Malaysia pada tahun 2000. Walaupun kadar penyertaan anuiti pada ketika itu tinggi, produk ini ditangguhkan oleh kerajaan setahun selepas itu. Bantahan terhadap skim itu termasuk spekulasi bahawa syarikat insurans boleh mendapatkan keuntungan secara berlebihan daripada skim ini dan kurang melindungi simpanan persaraan pencarum. Sejak itu, anuiti hampir tidak wujud di pasaran insurans. Dalam Bajet Kerajaan Malaysia baru-baru ini, peningkatan pelepasan cukai untuk pendapatan yang digunakan bagi tujuan membeli anuiti dilihat sebagai usaha menggalakkan pembangunan pasaran anuiti di Malaysia. Sehingga kini, terdapat kekurangan analisis yang tepat di Malaysia untuk membantu pembeli memahami nilai anuiti, terutamanya ketika mencapai tahun persaraan. Kajian ini mengira nilai untuk wang produk anuiti persendirian di Malaysia dengan mengira Nisbah Nilai Wang dan Anuiti Bersamaan Harta bagi produk anuiti yang terkini. Analisis ini akan digunakan untuk menilai sama ada anuiti di Malaysia berfaedah untuk dibeli oleh pengguna.

Kata kunci: pasaran anuiti Malaysia; nilai untuk wang; Nisbah Nilai Wang; Anuiti Bersamaan Harta; anuiti

1. Introduction

Since inception in 1951, the Employees Provident Fund (EPF) as a government-guaranteed institution who manages the retirement fund of private sector employees in Malaysia has been providing reasonable returns to EPF members each year. The investment returns of the EPF average between 4% to 8% per annum over the past 50 years (EPF 2010). On the other hand, the decumulation phase also requires attention: the risk of outliving ones assets amongst EPF members needs to be managed. This risk is even greater considering the lump sum withdrawal option given to members upon attaining retirement age. According to Thillainathan (2004), there may be a shortage of members' retirement savings since members are allowed to withdraw up to 40% of their savings pre-retirement to finance housing, education and health needs1.

In the year 2000, a group of private insurance companies named the 'Konsortium Annuiti Malaysia' introduced the EPF Annuity Schemes in an effort to provide a better decumulation scheme for members. Through this scheme, members were allowed to withdraw savings from their EPF account for the purpose of buying an annuity product. The introduction of this scheme has been a controversial issue since it received negative feedback from several entities, including a Malaysian workers' representative body known as the Malaysian Trade Union Congress (MTUC). It was suspected of being an excessively profitable scheme for insurers as it was managed by private insurance companies and not government. Members were exposed to uncertain investment returns and the risk of losing all of their savings if the insurers failed. The scheme could have been more popular if it had been provided by a government funded body or, perhaps, the EPF itself. As a result, this scheme was suspended by government at the end of 2001. Surprisingly, the participation to this scheme was tremendous with total single premium income of over RM4 billion collected from over 200000 EPF members as at the date that the scheme was suspended (Mohd Kassim 2003). The discontinuation of the EPF Annuity Schemes has been a huge loss to the insurance industry with a drop of 48.2% in the single premium business — in contrast to the previous years' remarkable growth of 171.7% in 2000 and 131.5% in 2001 (Aziz 2002).

The annuity market since almost shut down with only policyholders who opt to stay in the scheme making up the small number of annuitants in Malaysia. Furthermore, the Central Bank of Malaysia as a financial industry regulator is very strict with the approval of annuity business, which must comply with the high capital requirement following the introduction of the Risk Based Capital requirement in 2007. Recently, the Prime Minister of Malaysia announced an increase in the tax concession on income used to purchase an annuity (in the Malaysian Government Budget of 2012). This incentive seems to promote the development of the annuity market following the approval of the New Annuity Plan (a new private annuity product) few months after the announcement was made. Despite that, due to the controversy surrounding annuities in 2000, it is uncertain whether this new product will receive a positive response from customers.

The main objective of this paper is to provide the value for money analysis of private annuities in Malaysia. Till present, few papers have been written on Malaysia's private annuities. It is the aim of this paper to fill that gap. The structure of this paper is as follows. Section 2 discusses the annuity experience of Malaysia, lessons learned from the annuity suspension in 2001 and the future of annuity provision in Malaysia. Methods and models used for annuity value for money analysis, namely the Money's Worth Ratio (MWR) and Annuity Equivalent Wealth (AEW) are explained in Section 3. Lastly, section 4 contains the results of our analysis and section 5 concludes.

2. The Annuity Experience in Malaysia

In 2000, EPF members were allowed to withdraw their savings for the purpose of purchasing an annuity product. This scheme known as the EPF Annuity Schemes comprising the EPF Conventional Annuity Scheme (SAKK) and the EPF Islamic Annuity Scheme (SATK). In this paper, we focus on SAKK as details about the product features and data on annuity prices for SATK have eluded us. The annuity product provided under the SAKK scheme was a type of participating single premium annuity which commenced payment upon retirement at 55. It was provided by a consortium of private insurance companies called the 'Konsortium Anuiti Malaysia'. For each unit purchased under this scheme, the benefits are described by Mohd Kassim (2003) as follows:

- A single life annuity of MYR1200 per year at purchase date plus bonus in addition to the base annuity projected at 2% per annum compound during the deferred period and continuing after annuity payment starts at 55.
- Annuity payment is guaranteed for ten years after the commencement of payment.
- A ten year annuity certain as a death benefit prior to the vesting age of 55.
- A Total and Permanent Disability (TPD) benefit prior to retirement of an immediate annuity for a minimum of ten years commencing from the date of disablement.

The single premium contribution rates of the EPF Annuity Scheme can be found in Table 1. The introduction of this scheme into the market was controversial with negative feedback from several entities, including a Malaysian workers representative body known as the Malaysian Trades Union Congress (MTUC). According to Mohd Kassim (2003), objections made towards this scheme were due to three reasons. First, it was a scheme managed by private insurers and thus suspected of generating excessive profits for insurers. Second, members were not protected from investment risk and could lose their savings. Third, there were instances of product misselling by insurance agents.

At the end of 2001 this scheme was suspended by government due to these objections. Policyholders were given the option to opt out of the scheme and receive a refund of the premium paid. There was a suggestion from the MTUC that the annuity scheme be managed by the EPF instead of private insurers so that policyholders would be more protected. A decision on the reintroducing this annuity scheme has been postponed until further study are made by the EPF - even though the demand for this annuity option was high. Interestingly, at the date the scheme was suspended the total business included 273392 policies with total single premium income of RM5.1 billion (Tunku Abdullah 2002).

Table 1: Premium Contribution Rates for the EPF Annuity Scheme (SAKK)

Entry Age	Premium Rates (MYR)	
	Male	Female
35	7087	7867
45	11454	12731
55	19152	21288
65	16217	18025

Source: Mohd Kassim (2003)

Since this suspension in 2001, efforts have been made by insurers to reinvigorate the annuity market. The Central Bank of Malaysia is, however, being very strict with product approval. Moreover, with the Risk Based Capital requirement introduced in 2007, annuities have become more expensive to offer in the market. The recent announcement of an increased tax concession on income used to purchase an annuity of up to MYR3000 per annum the Malaysian Government Budget 2012 led to the introduction of a new private annuity plan into the market in the same year (Yee 2012). This private annuity product which we refer to in our paper as the New Annuity Plan, provides the following benefits:
• guaranteed yearly annuity income for 10 years or 15 years depending on choice of retirement age of buyers (either at age 55 or age 60). This is a non-participating deferred term annuity plan where benefit of annuity income is only payable for term period of 10 or 15 years upon the survival of the annuitants to age 55 or age 60.
• payment of a policy cash value for unfortunate events such as death, total and permanent disability or diagnosis of critical illness (Angioplasty or other invasive treatments for Major Coronary Artery Disease are not covered). These benefits are payable both prior to and after the vesting age of annuity payment.

The New Annuity Plan may prove popular. It is a tax-sheltered vehicle for harnessing after tax savings to provide retirement income and complements existing EPF savings. Moreover, the Malaysian government has also proposed removing an 8% investment income tax on deferred annuity funds. However, the New Annuity Plan faces competition from the Private Retirement Scheme (PRS) — launched in July 2012. PRS is a voluntary long-term investment scheme managed by a non-profit organisation, set up by the government, and known as the Private Pension Administrator (Securities Commission Malaysia 2013). The scheme, also funded by after tax savings, serves as a complementary voluntary scheme to provide extra retirement income on top of the mandatory EPF savings. Compared to an annuity, PRS has a different framework where investors can choose to invest from a list of selected investment products approved by a regulatory body, the Securities Commission Malaysia. Similarly, this scheme is also entitled to personal tax income relief of up to MYR3000 per annum. Note that the tax income relief for both schemes is only effective for ten years.

The PRS may be more suitable for people who prefer to manage their own retirement funds, having freedom of access to a palette of investment funds. For customers who are looking for guaranteed income without having to worry about investment allocation, the New Annuity Plan may be preferable. In any case, both offer more retirement choices for Malaysians. This is supported by the Life Insurance Association Malaysia who believes that the government's proposal for tax relief on the New Annuity Plan and the PRS is a major boost in retirement planning options (Singh 2012).

3. Methodology

We consider two valuation methods to evaluate the value for money of private annuities in Malaysia. This section explains the concepts underlying each method together with the basic mathematical formulation required for the analysis.

3.1 *Money's Worth Ratio*

Our analysis of the value for money of annuities begins with the construction of the Expected Present Discounted Value (EPDV) formulation of the annuity product. The EPDV will be used to assess the money's worth of the annuity schemes in relation to the initial purchase price, or premium, of an annuity product. This approach is called the Money's Worth Ratio, commonly used by economists around the world for the purpose of valuing annuities. James and Vittas (2000) use the Money's Worth Ratio to analyse the annuity markets in several countries, namely Australia, Canada, Chile, Israel, Singapore, Switzerland and the United Kingdom. Also, Mitchell *et al.* (1999) use a Money's Worth Ratio computation to value individual life annuities in the United States. The concept of money's worth was introduced in Mitchell *et al.* (1999) with a term called the expected present discounted value per dollar annuity premium. In a later paper by Knox (2000) the same concept was used, but with a different term called the Money's Worth Ratio and the ratio is then expressed as a percentage. The Money's Worth Ratio provides useful information for both annuity providers and customers to differentiate between ranges of annuity products. As described by Mitchell (2001), the Money's Worth Ratio represents a currency independent metric for comparing annuity products anytime and anywhere in the world. There are three important components in the EPDV formulation of an annuity product: the amount of annuity payments, mortality rates and interest rates used as discounting factors. The basic formula for computing the Money's Worth Ratio (MWR) for an annuity product is as follows.

$$MWR = \frac{EPDV}{P} \tag{1}$$

where

$EPDV \equiv$ the Expected Present Discounted Value of an annuity product
$P \equiv$ the market premium of an annuity product

The EPDV depends on the structure of the annuity product. Based on the structure of the EPF Annuity Scheme and the New Annuity Plan, the EPDV has three components of benefit, namely the annuity element (both term-certain and life annuity), the death benefit and the additional benefits (consist of benefit payable in the event of total and permanent disability and critical illness). Since the calculation of death benefit and additional benefits in the value for money analysis requires further extensive data (in particular, the cash value information and the total and permanent disability and critical illness rates), we value only the annuity element for both products. Thus, the analysis in this paper shows the value for money of only the annuity element of annuities in Malaysia. We develop the EPDV formulation for the EPF Annuity Scheme as follows - and then apply the same method to derive the EPDV of the New Annuity Plan:

$$V_x(A) = \sum_{j=55-x}^{65-x-1} \frac{A}{\prod_{k=1}^{j}(1+i_k)} + \sum_{j=65-x}^{100-x-1} \frac{A_j P_x}{\prod_{k=1}^{j}(1+i_k)} \tag{2}$$

where

$V_x(A) \equiv$ the expected present discounted value of a life annuity paying A yearly, purchased by a person aged x. The limiting age is 100.
$A_j \equiv$ the yearly benefit of a life annuity

$P_x \equiv$ the probability of a person aged x survives to age x+ j
$i_k \equiv$ the nominal short-term interest rates during the kth period

Based on the MWR formulation, an actuarially fair annuity premium will generate an MWR value of one (Fong *et al.* 2011). However, in practice, insurers have to include loadings which lead to higher premium charges. These transaction costs cover marketing costs, management costs, insurer's reserves and profits as well as adverse selection costs (Mitchell *et al.* 1999). The adverse selection cost is taken as the difference between the MWR value calculated using annuitant mortality rates and the MWR value calculated using the population mortality rates, which then expressed as a percentage, as in Fong (2011).

3.2 *Annuity Equivalent Wealth*

The "Equivalent Wealth Valuation", described by Mitchell (2001), is another way of valuing annuity products. It takes into account the insurance value of an annuity product to the consumer which has been neglected in the previous valuation method. Here, the insurance value of annuities can be interpreted as the protection against longevity risk by providing annuitants with a stream of income for as long as they survive. Given an annuity as an option to decumulate retirement wealth, EPF members would be interested in knowing how much he or she should rationally forgo to receive this insurance value. The Annuity Equivalent Wealth (AEW) computation addresses this issue.

The concept of Annuity Equivalent Wealth was used by Kotlikoff and Spivak (1981) to compare the expected utility difference between a consumer with and without access to a perfect annuity market. This method then applied to the individual optimal consumption decision problem by Mitchell *et al.* (1999) using multi-period additively separable utility functions. One advantage of using this method is that it manages to capture differences risk aversion levels amongst consumers. Generally, ones level of risk aversion affects consumer utility impacting on a consumer's decision to annuitise. For instance, a risk averse consumer will value annuities higher than the value computed using the simple financial of money's worth approach (Mitchell 2001). Roughly, the AEW measures the ratio of the value of non-annuitised assets to the value of annuitised assets producing equivalent utility. Precise details of the AEW are given below.

Consider a representative individual who is assumed to maximise his expected utility function by following an optimal consumption path, C_t. We denote his expected utility function as a value function, V.

$$V = \max\{C_t\} \sum_{t=y-x}^{T-x} \frac{tP_x U(C_t)}{(1+\rho)^t}$$

(3)

where

$C_t \equiv$ the optimal consumption at time *t*
$U(C_t) \equiv$ the utility function for a consumption of C_t
$tP_x \equiv$ the probability that a person aged *x* survives to age *x+t*
$T \equiv$ the maximum possible lifespan $x \equiv$ the person's age at the time of purchase
$y \equiv$ the person's age when the annuity payment commences
$\rho \equiv$ the rate of time preference

The budget constraint for this individual depends on two conditions, first, in the presence of an annuity market, and second, in the absence of an annuity market. Thus, given initial wealth of W_0, and a nominal interest rate (combining a real interest rate of r and an inflation rate of π), the budget constraint is derived below.

First condition: with an annuity the budget constraint is as follows.

$$W_0 = 0 \tag{4}$$
$$W_t \geq 0 \tag{5}$$
$$W_{t+1} = (W_t + A_t - C_t)(1 + r)(1 + \pi) \tag{6}$$

Second condition: without an annuity the budget constraint is as follows.

$$W_0 = w \tag{7}$$
$$W_t \geq 0 \tag{8}$$
$$W_{t+1} = (W_t - C_t)(1 + r)(1 + \pi) \tag{9}$$

In the first condition, the initial wealth after annuitisation is set to be 0 as the consumer consumed all of his initial wealth to purchase annuity with a premium P and in return, receiving At of yearly annuity income. We follow the method in Brown (2003) to determine P as follows.

$$P = \sum_{t=y-x}^{T-x} \frac{A_t {}_t P_x}{(1 + r)^t (1 + \pi)^t} \tag{10}$$

Given a yearly annuity income of At, we can determine an actuarially fair price P of an annuity using the above formula. We can also find the market price P' of an annuity which typically allows for loadings, — by multiplying the right hand side of Eq. (10) by $(1+l)$ where l is the load factor. From the optimisation problem of Eq. (3), we find the optimal consumption path for the individual under the first condition. Then, we evaluate the expected utility level, V, associated with that consumption path. Next, we move to the second condition and again solve the optimization problem—but this time solve it by C_t by finding the initial wealth level w such that the individual has the same level of expected utility V, making him as well off as if he had access to an annuity market.

As in most literature for the AEW analysis, we assume that this individual has a utility function of $U(C_t)$ of form:

$$U(C_t) = \frac{C_t^{1-\gamma}}{1 - \gamma} \tag{11}$$

where γ is the Arrow-Pratt coefficient of relative risk aversion and $1/\gamma$ is the elasticity of intertemporal substitution in consumption. Lastly, we compute the ratio required in terms of the initial wealth level for this individual to achieve the same expected utility under bothconditions. Here, α is Annuity Equivalent Wealth. It is expressed in terms of ratio of the non-annuitised wealth over the annuitised wealth:

$$Annuity\ Equivalent\ Wealth\ (\alpha) = \frac{non-annuitised\ wealth\ (w)}{annuitised\ wealth\ (P)} \tag{12}$$

For illustration, let us consider an individual who consumed $5000 to purchase an annuity (P) in order to achieve his maximum expected utility (V). An I value of 1.5 indicates that he would require 150% of his annuitised wealth or $7500 of non-annuitised wealth to obtain the same expected utility, V. In this paper, we use the AEW computation to measure whether there is a utility gain if someone makes a purchase under the EPF Annuity Scheme or the New Annuity Plan.

4. Findings

4.1 *The Money's Worth Ratio Results*

As described in Section 3, our analysis consists of interpreting value for money metrics for annuities using two valuation methods, namely the Money's Worth Ratio (MWR) and the Annuity Equivalent Wealth (AEW). The analysis of the EPF Annuity Scheme, which was introduced in 2000, is divided into three categories. The product was a participating annuity scheme with a projected 2% compounded bonus per annum prior and after the commencement of annuity payment. However, there is no guarantee that the insurers will always pay the full amount of the bonus every year. Consideration has to be taken for the possibility of no bonus at all or a bonus of less than 2% per annum. Thus, we provide the MWR and the AEW values for three possibilities: without bonus, with 1% compounded bonus per annum and with 2% compounded bonus per annum.

Table 2 presents the results for the MWR analysis of the annuity element of the EPF Annuity Scheme (SAKK). In addition, we calculate the adverse selection cost of the product by computing the (percentage) difference between the MWR value obtained from the annuitant mortality table and its population mortality table equivalent, as in Fong (2011). Comparing results from Table 2 for 'without bonus' to 'with 1% or with 2% bonus' we can see that the MWR value are consistently increasing as the bonus payout increases from none to its full bonus amount of 2% per annum for all entry ages. This is expected, given the same annuity market prices P as in Table1 (the MWR denominators), but higher annuity payouts (the MWR numerators). Each MWR value calculated using two term structure of interest rates. The MGS represents the Malaysian Government Securities risk-free interest rates and the CB represents the AAA Corporate Bond which gives the term structure of (risky) bond rates. The higher yield rates for corporate bonds produces lower values for the MWR of the EPF Annuity Scheme, especially when no bonus is paid and the entry age is below 55. On the other hand, if the insurer pays full bonus, the MWR values obtained under the MGS term structure of interest rates are reasonably high, with some values even exceeding unity — which indicates the customer is paying less than the actuarially fair price of the product.

The adverse selection costs of the product ranges from 4 to 30 percent. Similarly, these costs increase as the bonus payout increases, showing that the product favours the group of annuitants with high survival probabilities most when the full bonus amount is paid by insurers. Our results for the adverse selection costs of the EPF Annuity Scheme are quite consistent with the previous literature, which is on average, around 10 to 15 percentage points in Mitchell *et al.* (1999). However, the cost can be quite high when bonus payments are included.

Table 2: Money's Worth Ratio and Adverse Selection (AS) Costs of the EPF Annuity Scheme

Entry Age	Male			Female		
Without compounded bonus	Population	Annuitant	AS (%)	Population	Annuitant	AS (%)
MGS						
35	0.646	0.719	7.3	0.655	0.803	14.8
45	0.702	0.778	7.6	0.711	0.865	15.4
55	0.747	0.819	7.2	0.755	0.907	15.2
65	0.741	0.822	8.1	0.747	0.956	20.9
CB						
35	0.374	0.408	3.4	0.379	0.442	6.3
45	0.490	0.532	4.2	0.495	0.575	8.0
55	0.648	0.699	5.1	0.633	0.727	9.4
65	0.644	0.723	7.9	0.648	0.790	14.2
Bonus 1%	Population	Annuitant	AS (%)	Population	Annuitant	AS (%)
MGS						
35	0.861	0.972	11.1	0.874	1.105	23.1
45	0.848	0.952	10.4	0.860	1.078	21.8
55	0.818	0.908	9.0	0.828	1.024	19.6
65	0.794	0.892	9.8	0.801	1.056	25.5
CB						
35	0.494	0.544	7.3	0.500	0.598	9.8
45	0.586	0.642	7.7	0.593	0.705	11.2
55	0.704	0.767	6.7	0.686	0.806	12.0
65	0.686	0.778	8.8	0.691	0.863	17.2
Bonus 2%	Population	Annuitant	AS (%)	Population	Annuitant	AS (%)
MGS						
35	1.150	1.319	16.9	1.171	1.533	36.2
45	1.028	1.171	14.3	1.044	1.355	31.1
55	0.901	1.014	11.1	0.912	1.166	25.4
65	0.853	0.970	11.7	0.861	1.174	31.3
CB						
35	0.653	0.728	10.6	0.663	0.814	15.1
45	0.703	0.780	10.3	0.712	0.869	15.7
55	0.768	0.846	8.3	0.748	0.901	15.3
65	0.732	0.841	10.4	0.738	0.948	19.0

Next, Table 3 presents the MWR values and the adverse selection cost of the New Annuity Plan which was introduced in 2012. In contrast to results from the EPF Annuity Scheme, the MWR values for female are always higher than male here because we only use one standard annuity price for both genders - the annuity provider charges the same market premium for both genders. Thus, the lower mortality rates of female group gives a higher value of MWR for all entry ages. Besides, the MWR values also slightly higher for payment term 2 compared to payment term 1 since benefit payment is higher when the payment term is longer. Notice that the difference of MWR values under the MGS term structure and the CB term structure for the NewAnnuity Plan is not as much as in the previous result which supports by the smaller spread of difference between the government bond and the corporate bond interest rates in 2012 as compared to year 2000. Overall, the MWR values of the New Annuity Plan are less than unity for all entry ages, both payment terms and both options A and B. The high capital requirement by the Central Bank of Malaysia for annuity business provider might be the reason for lower than unity MWR values. Appropriate loading factors have to be accounted for when pricing such annuities to ensure the sustainability of the product in the market.

For the EPF Annuity Scheme, with the exception of without bonus MWR values, our result is quite consistent with the MWR values of US annuities (Mitchell *et al.* 1999) under the

government bond term structure of interest rates but lower under the corporate bond term structure of interest rates. For the New Annuity Plan, international comparison is hardly available as most previous literature produce results of MWR values for entry ages of 55 and above. However, if we ignore the entry age and compare the MWR values of the New Annuity Plan with the MWR values of annuities around the world, they are slightly lower. Most MWR values in other countries ranges from 0.8 to 1.1. Eventhough the value for money of the New Annuity Plan is quite low, the adverse selection effect for the product is very small and consistent with results in Fong (2011) for Singapore annuities.

In considering all the foregoing MWR values an important caveat needs to be drawn to the reader's attention. The MWR analysis in this paper only calculates the dollar value of the annuity element in the numerator — it uses the market premium in the denominator. Since these products also provide other non-annuity benefits (like death benefit, a total and permanent disability or a critical illness benefit) the MWR values are not precise, and are lower than the true MWR values. That is, the denominator values are overstated from this pure annuity values; they include other insurance values. For the EPF Annuity Scheme values the degree of understatement will be small (as the expected values of the additional benefits is quite small relative to the annuity values); for the New Annuity Plan the degree of understatement will be larger (as the expected value of additional benefits is larger relative to the annuity values). This calls for deeper research into the (complex) nature of the additional benefits. The AEW values, however, do not suffer from this bias, and it is to their analysis we now turn.

Table 3: Money's Worth Ratio and Adverse Selection (AS) Costs of the New Annuity Plan

Entry Age	Male						Female					
Option A Retirement age at 55	Population		Annuitant		AS(%)		Population		Annuitant		AS (%)	
Payment term	1	2	1	2	1	2	1	2	1	2	1	2
MGS												
35	0.727	0.759	0.779	0.805	5.3	4.6	0.793	0.819	0.835	0.858	4.2	3.9
45	0.773	0.777	0.815	0.818	4.2	4.1	0.822	0.826	0.862	0.865	3.9	3.9
CB												
35	0.596	0.645	0.639	0.684	4.3	3.9	0.650	0.696	0.684	0.729	3.4	3.3
45	0.693	0.699	0.730	0.735	3.7	3.6	0.736	0.742	0.771	0.776	3.5	3.4
Option B Retirement age at 60	Population		Annuitant		AS(%)		Population		Annuitant		AS (%)	
Payment term	1	2	1	2	1	2	1	2	1	2	1	2
MGS												
35	0.710	0.752	0.773	0.805	6.2	5.3	0.791	0.825	0.846	0.875	5.5	5.0
45	0.728	0.754	0.780	0.801	5.2	4.7	0.790	0.812	0.843	0.861	5.2	4.8
CB												
35	0.494	0.632	0.617	0.676	4.9	4.5	0.632	0.693	0.676	0.735	4.3	4.2
45	0.586	0.671	0.680	0.713	4.5	4.2	0.689	0.722	0.734	0.765	4.5	4.3

4.2 *The Annuity Equivalent Wealth Results*

The analyses of theAnnuity Equivalent Wealth (AEW) in the previous literature assume a fixed real interest rate and inflation rate over time. For instance, Brown (2003) and Fong (2011) used a real interest rate and inflation rate of 3%, where $r = \pi = 3\%$. In our analysis, as we do not have the real interest rates information, we assume to follow the term structure of interest rate that reflects the Malaysian data rather than assuming a fixed rate. According to the Eq.(10), the total discounted factor in the formulation is the nominal rate of interest so we decide to choose the average nominal risk-free interest rate used in the MWR analysis. We follow their assumption of the rate of time preference, $\rho = 3\%$.

Table 5 shows the AEW values of the EPF Annuity Scheme (SAKK) for all three possibilities of without bonus, with 1% bonus and with 2% bonus respectively. While Table 6 presents the AEW values of the New Annuity Plan for both option A and B. For comparison purpose,we choose two different level of risk aversion of $\gamma = 1.5$ and $\gamma = 3$. Since prior studies on consumption such as Laibson *et al.* (1998), and Brandt and Wang (2003) found that the average risk aversion level parameter is between 1 to 2, the γ values that we choose seem reasonable. The AEW values presented here are calculated based on the actuarially fair annuity price as in most studies.

First, we find that by increasing the risk aversion level from 1.5 to 3, the AEW values for all categories of the New Annuity Plan (Table 5) increase by a small amount as the consumer generally values annuity more if he has a high risk aversion level. This is not the case for the EPF Annuity Scheme as this annuity product offers an increase bonus payment on top of the basic annuity income, thus a more risk averse consumer may value it lower as he prefers a smooth consumption pattern. Another factor that affects the consumer behaviour here is the higher risk-free interest rate in year 2000 (the average risk-free interest rate is 5.7% in 2000 and 3.5% in 2012). Given a higher rate of interest, a more risk averse consumer would be less willing to forgo current consumption for future consumption, thus value annuity lower than a less risk averse consumer. Only for some category of entry age 65, the AEW is higher for a more risk averse individual (refer to Table 4). However, the difference of AEW value calculated using a risk aversion level of 1.5 and of 3, are not significant for all categories. For the New Annuity Plan, the difference in AEW is very small which resulted in equal value up to 3 decimal points if the annuity premium is charged using the actuarially fair price regardless of payment term 1 or 2.

Overall, based on actuarially fair price annuity, our AEW result is consistent with prior studies where both the EPF Annuity Scheme and the New Annuity Plan provide a good value for money for consumers. All values of AEW are greater than 1 which shows that a consumer without access to annuity would need higher initial wealth amount to achieve the same expected utility level as if he had access to annuity by $[AEW(\alpha)-1](100)\%$. Our result is consistent with previous studies where given an actuarially fair annuity product, consumer would always find full annuitisation as an optimal consumption strategy.

5. Conclusion

Annuities are less popular in Malaysia compared to other insurance products; the annuity market is very small and almost non-existent in the past several years. Annuitisation rates were quite high in 2000, following the introduction of the EPF Annuity market which allows EPF members to withdraw their EPF savings for the purpose of purchasing annuities. Since the EPF Annuity was not a government funded or backed up scheme, this product was

controversial due to the perceived lack of protection of members' retirement savings and uncertain investment returns. Objections by several entities, including a Malaysian workers representative body, to the scheme lead to the suspension of the EPF Annuity Scheme at the end of 2001. Since then, the percentage of new business premiums for annuities has been almost 0% of total new business premiums in the insurance market (Aziz 2011).

Table 4: Annuity Equivalent Wealth of the EPF Annuity Scheme

Entry Age	Male		Female	
Without compounded bonus				
Gamma	1.5	3.0	1.5	3.0
35	1.299	1.294	1.152	1.142
45	1.298	1.294	1.166	1.157
55	1.288	1.281	1.172	1.163
65	1.456	1.476	1.285	1.284
Bonus 1%				
Gamma	1.5	3.0	1.5	3.0
35	1.294	1.293	1.147	1.142
45	1.298	1.293	1.161	1.157
55	1.288	1.287	1.168	1.162
65	1.456	1.476	1.282	1.284
Bonus 2%				
Gamma	1.5	3.0	1.5	3.0
35	1.298	1.274	1.151	1.120
45	1.298	1.277	1.165	1.133
55	1.287	1.269	1.172	1.143
65	1.456	1.464	1.285	1.270

Table 5: Annuity Equivalent Wealth of the New Annuity Plan

Entry Age	Male		Female	
Option A				
Gamma	1.5	3.0	1.5	3.0
Payment term 1				
35	1.307	1.333	1.201	1.225
45	1.328	1.356	1.258	1.274
Payment term 2				
35	1.307	1.333	1.201	1.225
45	1.328	1.356	1.258	1.274
Option B				
Gamma	1.5	3.0	1.5	3.0
Payment term 1				
35	1.400	1.433	1.259	1.289
45	1.435	1.470	1.335	1.356
Payment term 2				
35	1.400	1.433	1.259	1.289
45	1.435	1.470	1.335	1.356

Inspite of the high liabilities associated with issuing annuities, they have the attractive feature of providing a secure stream of income for retirees. Thus, governments in several countries still promote annuities as one of the options for retirement income. Singapore's CPF Annuity is the best example of a recent government annuity scheme. It is noteworthy that the price of this annuity really favours buyers. According to Fong (2011), the Singapore CPF Annuity has been designed as a government funded scheme which helps cost saving through economies of scale as retirees tend to choose risk-free retirement funds over riskier products offered by private insurers.

The recent Malaysian government budget of 2012 also supports annuity growth in Malaysia by increasing the tax exemption on income used to purchase annuities. Following that budget announcement, a new annuity plan has been introduced in the market for consumers to enjoy the tax exemption benefits announced by the Malaysian government. The recent controversial history of annuities in Malaysia suggests consumers may be wary.

This paper provides deeper understanding of annuities in Malaysia for consumers by computing the value for money of the annuity element of Malaysia's private annuities using two valuation methods, the Money's Worth Ratios (MWR) and the Annuity Equivalent Wealth (AEW). Assuming a risk-free term structure of interest rates, we found that the suspended EPF Annuity Scheme provides good value for money to consumers when a bonus is included in the annuity benefit.

The suspension of annuities in 2000 has had a great impact on the development of the annuity market in Malaysia. Current stringent regulations require any new annuity product offered in Malaysia to undergo an approval process directed by the Central Bank of Malaysia. Generally, our findings indicate that the New Annuity Plan introduced in 2012 has slightly lower value for money compared to the values of annuities around the world and the previous EPF Annuity Scheme. This suggests that stricter capital requirements have resulted in more expensive annuities. Furthermore, since the New Annuity Plan was designed as a retirement security product to provide guaranteed annuity income, the insurer would have to charge higher loadings compared to other non-guaranteed insurance products.

Lastly, it is important to point out again that our analysis only treats the annuity element of the product; it does not include the additional benefits provided under both the EPF Annuity Scheme and the New Annuity Plan. Thus, the value for money analysis is only correct for the annuity element of the product. Our calculated metrics ignore the value contribution of additional benefits such as death, total permanent disability and critical illness insurance. Furthermore, our analysis in this paper does not incorporate the tax incentives proposed by the Malaysian government. More extensive analysis requires more data and information on the transition probabilities for different health states incorporated in an extended model we shall pursue in future research. More importantly, the future challenges should be considered in developing annuity product not only on conventional basis but also takaful industry in the Malaysian insurance market such as discussed by Mohd Kassim (2015) and Soualhi (2017). The future of takaful based retirement product is more challenging due to the downsizing of the Shariah complied investment vehicles and the shortage of long term investment products (Soualhi 2017). This is an important element in managing the cashflows and to ensure the solvency of insurers who offers such annuity products.

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