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International Labour Organization

Report to the Government

Social Security Organization tenth actuarial valuation, as of 31 December 2014

Global Employment Injury Programme

Enterprises Department

ILO Regional Office for Asia and the Pacific, Bangkok

Malaysia

Report to the Government Social Security Organization tenth actuarial valuation, as of 31 December 2014

ILO/Global Employment Injury Programme (ILO/GEIP)
Enterprises Department, Geneva
ILO Regional Office for Asia and the Pacific, Bangkok

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FOREWORD

The Social Security Organization (SOCSO) of Malaysia was established in 1971 under the Ministry of Human Resources (MOHR) to administer the social security schemes under the Employees' Social Security Act, 1969 (Act 4), i.e. the Employment Injury Insurance (EII) Scheme and the Invalidity Pension Scheme. The tenth actuarial valuation is expected to serve as one of the periodical actuarial valuations as stipulated in the law and at the same time is intended to shape reform options and to check the relevance of the reforms already proposed in the ninth actuarial valuation of the Employment Injury Insurance (EII) Scheme and the Invalidity Pension Scheme. It will contribute to the sustainability of the Social Security Scheme and improvement of social protection as well as modernization of the labour market in Malaysia. Furthermore, it gives a relevant linkage and value added to one of the priorities of Malaysia's Decent Work Country Programme (DWCP), namely the increased capacity of the Government of Malaysia and social partners to develop and implement policies on social security.

The Government of Malaysia is mindful to promote inclusive growth for sustainable development and to ensure that all Malaysians can aspire to enjoy social and income security and social justice whenever facing an injury at work. The 2010 New Economic Model (NEM) supports a reform of the social protection system regarding the schemes' design, the adequacy of the coverage of the insurance schemes and the effective core social services and labour markets efficiency. This actuarial valuation is linked to the 2010 New Economic Model (NEM) which has prioritized the enhancement of social protection in Malaysia.

This report is organized in six sections. It reviews the experience of the five-year period of the Employment Injury Scheme and the Invalidity Pension Scheme. Then, it describes the projection of the general population and the macroeconomic framework used for the valuation which will constitute the framework for the projections of the Employment Injury Scheme and the Invalidity and Survivors' Benefits Scheme. Additional issues are also reviewed, such as the extension of the EI scheme to foreign workers and the 24-hour coverage of accidents under the EI scheme, among others. We are pleased to also share a summary of key SOCSO contribution and benefit provisions, a description of the methodology used for the valuation, key data inputs, assumptions and supplementary information on investment. The ILO shares its recommendations for the way forward and discusses relevant considerations regarding financial matters

We trust that this technical report is useful for those concerned with the financial sustainability and benefits adequacy of employment injury insurance in tandem with the economic goals of Malaysia. The ILO remains a dedicated partner to make Malaysia employment injury insurance successful for all enterprises and their workers.

Geneva, May 2017

Tomoko Nishimoto
Director
ILO Regional Office
for Asia and the Pacific

Anne Drouin
Director
Global Employment Injury Programme
Enterprises Department

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ACKNOWLEDGEMENTS

The Social Security Organization (SOCSO) of Malaysia requested the International Labour Organization (ILO) to carry out the tenth actuarial valuation of the Social Security Fund as of 31 December 2014 in the framework of a Funds-in-Trust agreement between the ILO and SOCSO for the provision of actuarial services. The Regional Director of the ILO Regional Office for Asia and the Pacific, Ms Tomoko Nishimoto, and the Director of the Global Employment Injury Programme (GEIP) of the Enterprises Department (ENTERPRISES), Ms Anne Drouin, in joint collaboration with the Actuarial Service Unit (SOC/ASU) of the Social Protection Department (SOCPRO) prepared this report.

The ILO appointed Mr Pierre Bergeron, Senior Actuary, Mr Gilles Binet, Senior Actuary, Mr Gilles Bouchard, Investment Analyst, Ms Doan-Trang Phan, Actuarial Modelling Expert and Mr Vincent Plamondon, Actuarial Modelling Expert, to conduct this actuarial review under the technical supervision of Ms Anne Drouin and Mr Hiroshi Yamabana, Senior Policy Adviser in Employment Injury of GEIP. They had discussions with SOCSO staff and consulted on the analysis of the statistical data required for the valuation. The actuaries worked in close cooperation with Dr Ponniah Raman, Manager, SOCSO Actuarial and Statistical Branch and his team's members, Ms Nurul Husna Binti Ibrahim and Ms Muniroh Mohd Fadzil.

Mr Bergeron, Mr Binet, Mr Bouchard and Ms Doan-Trang undertook a first mission to Malaysia between 25 November and 1 December 2015 to identify the stakeholders' expectations from the actuarial valuation, clarify the legislative provisions, familiarize themselves with the administrative practices and complete the data collection. Mr Yamabana undertook another mission to Malaysia jointly with Mr Bergeron and Ms Doan-Trang from 13–21 February 2017 to present the draft report to SOCSO and its Board of Directors and to deliver training to SOCSO staff on the actuarial model.

The Regional Director of the ILO Regional Office for Asia and the Pacific thanks Datuk Dr Mohammed Azman Aziz Mohammed, SOCSO Chief Executive, and Dr Ponniah Raman, Manager, Actuarial and Statistical Branch, for the courtesy and cooperation extended to the ILO. Particular thanks go to Ms Nurul Husna Binti Ibrahim and Ms Muniroh Mohd Fadzil for their invaluable support in the collection of data and information.

ABBREVIATIONS AND ACRONYMS

CAA	constant attendance allowance
CAD	Canadian dollar
CHF	Swiss franc
CPI	consumer price index
DB	Death benefit
DWCP	Decent Work Country Programme
GAP	general average premium
GDP	gross domestic product
EI	Employment Injury
ESRF	end stage renal failure
GEIP	Global Employment Injury Programme
HSP	Health Screening Programme
ILO	International Labour Office/Organization
IMF	International Monetary Fund
IS	Invalidity and Survivors
ISSA	International Social Security Association
MIE	maximum insurable earnings
MOH	Ministry of Health
MOHR	Ministry of Human Resources
MOT	Ministry of Transport
MYR	Malaysian Ringgit
NCD	non-communicable disease
NEM	New Economic Model
NKF	National Kidney Foundation
NZD	New Zealand dollar
PAYG	pay-as-you-go
PD	permanent disability
ROR	rate of return

RTW	Return to Work programme
SOCSO	Social Security Organization
SP	scaled premium
TD	temporary disability
TFR	total fertility rate
TFS	total funding system
UN	United Nations

EXECUTIVE SUMMARY

This report presents the results of the tenth actuarial valuation of the employees' Social Security Fund of the Social Security Organization (SOCSO) as of 31 December 2014. The Employment Injury Benefits branch and the Invalidity (and Survivors') Benefits branch have been valued. A description of the scheme's benefits, a summary of the methodology of the actuarial valuation, a set of scheme-specific data and assumptions used in this report and information on investments are included in the appendices.

1. EMPLOYMENT INJURY BENEFITS

The overall financial situation of the Employment Injury Benefits branch was sound on the valuation date. The cost of the scheme has been contained within the current contribution rate of 1.25 per cent. The contingency reserve has been constituted at the required level and substantial free reserves have continued to accumulate.

The amount of the technical reserve, at MYR 4,900,603 as of 31 December 2014, is not sufficient to cover the branch's liabilities calculated by using the revised new present value factors, which are higher than the current present value factors stipulated in the regulations. It is recommended that the technical reserve should be increased by transferring the required amount from free reserves and that revised present value factors should be used in the future.

It is recommended that a prospective methodology should be used to calculate the technical reserve in the balance sheet, that the technical reserve should be confirmed by an actuary, and that the capitalized value of new awards of permanent disablement pensions and dependants' benefits should become available in the SOCSO Annual Report.

Although the current cost of the Employment Injury Benefits branch is lower than the 1.25 per cent of insurable earnings, benefit expenditure has been steadily increasing faster than the contribution income, mainly due to the increase in the number of commuting accidents. It is therefore recommended that the current contribution rate of 1.25 per cent should be maintained and reassessed at the next actuarial valuation.

In order to maintain the real value of the permanent disablement and dependants' benefits in line with inflation, it is recommended that benefits awarded before 2011 should be increased by 10.4 per cent, those awarded in 2011 by 8.3 per cent, those awarded in 2012 by 6.6 per cent, those awarded in 2013 by 4.4 per cent and those awarded in 2014 by 1.2 per cent.

The introduction of an annual automatic indexation of benefits in line with inflation, instead of the current method at the time and as the result of each actuarial valuation, should be considered.

As the contribution rate of the Invalidity and Survivors' Benefits branch needs to be gradually increased over the long term, the transfer of free reserves of the Employment Injury Benefits branch to the Invalidity and Survivors' Benefits branch should be considered.

It is recommended that mortalities of each type of pensioners and recovery rates of permanent disablement pensioners should be annually monitored and reported. This would be of great value in determining assumptions for the actuarial valuations and present value factors.

2. INVALIDITY AND SURVIVORS' BENEFITS (IS)

The pay-as-you-go (PAYG) cost rate of the Invalidity and Survivors' Benefits branch, which is the contribution rate to balance annual income and expenditure, was 1.45 per cent in 2014 and will steadily increase. The projections indicate that the fund would be depleted in 2026 and that the combined SOCSO assets would be depleted in 2040 if the current contribution rate of 1 per cent was maintained.

As the Invalidity and Survivors' Benefits branch adopts the partially funded method, the contribution rate must be gradually increased to meet increasing benefit expenditure. More detailed options in dealing with the finance of SOCSO's two branches, including recommendations on the timing and the level of the contribution rate increase of the Invalidity and Survivors' Benefits branch, are found in Section 5.

The recommendations for increasing benefits as well as monitoring mortality and recovery rates apply both to invalidity and survivors' benefits and permanent disablement and dependants' benefits of the Employment Injury Benefits branch.

3. ASSESSMENTS OF RECENT AND CONTEMPLATED CHANGES

Minimum benefits, constant attendance allowances, maximum insurable earnings

The changes in the minimum benefit, in the constant attendance allowance and in the maximum insurable earnings have a small impact on the cost of both branches.

Extension of coverage to age 60 (IS)

The financial impact of the extension of coverage to age 60 in the invalidity branch is substantial, as the general average premium (GAP) increases from 1.71 to 2.11 per cent.

No-claim bonus

In response to critics of the branch from workers who have contributed during their whole career but have received no benefit, a no-claim bonus at age 60 for the IS branch is contemplated by SOCSO. Based on international experience on retirement pensions, the cost of the benefit as a refund of workers' contributions with interest at age 60 for those who have not taken up any benefit from the IS branch is assessed as an 11 to 13 per cent increase of the PAYG cost rate of the IS branch, depending on eligibility conditions. It is recommended not to implement such benefit and to undertake an education campaign to address the matter. Insured people should be aware that any additional benefit generates extra cost and that the current SOCSO scheme is different from retirement pension schemes.

Replacement rates of temporary and permanent disablement benefits

The replacement rates of temporary and permanent disablement benefits in the EI branch have been reviewed. The replacement rates are well above the 60 per cent specified in the ILO Employment Injury Benefits Convention, 1964 (No. 121) and the 66.7 per cent specified in its accompanying Recommendation No. 121; it is internationally among the most generous rates. The disability percentages in the Second Schedule in the SOCSO Act are more generous than those of three other schemes examined.

The risk of under- or overcompensation is significant for partially disabled workers because of the limitations of the Second Schedule. Moving from a system relying exclusively on a table of disability percentages to a system with separate compensation for occupational and physiological damages could be envisaged. It is recommended that SOCSO should develop an understanding of such a separate compensation approach in order to propose a change to stakeholders if the current approach proves to be inadequate.

Return to Work Programme, Rehabilitation Centre, dialysis treatment, Health Screening Programme

These programmes are important elements of social security and provide invaluable services to insured workers, employers and the society of Malaysia. SOCSO is encouraged to collect data and establish indicators to monitor their efficiency and impact on the schemes' costs.

SOCSO's in-house actuarial and statistical capacities

SOCSO has asked the ILO to make recommendations for further development of in-house actuarial and statistical capabilities. In order to formulate specific recommendations, the responsibilities of SOCSO actuarial and statistical staff must be analysed and their current capacities assessed. As this is not included in the terms of reference of the current actuarial valuation, recommendations are limited to comments on training activities for capacity building and an overview of the role of actuaries and the organization of actuarial services within a social insurance organization.

Statisticians should be given the opportunity to maintain and enhance their expertise through exposure to international best practices, for example, specialized seminars and technical visits to institutions. It is recommended that actuarial staff should be more integrated into SOCSO's benefit administration structure so that more elaborate statistics for future actuarial studies can be gathered. The actuarial staff are encouraged to make efforts to enhance their understanding and practice of the ILO's actuarial valuation models and tools. Participation in actuarial organizations such as the Actuarial Society of Malaysia should be encouraged for the actuarial staff.

Extension of EI scheme to foreign workers

Foreign workers are more involved in higher-risk industries and exposed to higher risk of employment injuries than SOCSO's currently insured workers. The cost ratio of foreign workers is 30 basis points higher than that of SOCSO's currently insured workers in the long term. Taking into account the weight of foreign workers to SOCSO's currently insured workers, the impact of extension on the cost ratio is 4 basis points. Despite limitations of the available data regarding the distribution of workers by industry and the frequency and the severity of injuries, it is concluded that the current contribution rate of 1.25 per cent should be applicable to foreign workers without compromising the EI branch financial sustainability.

The extension of coverage would require adjustments and innovation in the delivery of services. SOCSO should carefully analyse the impact of such an extension on its operations and identify how the most recent technologies can be applied.

24-hour coverage of all accidents

Very few countries in the world provide benefits similar to EI benefits for non-work--related accidents. Among the reasons given by those countries that do provide such benefits are the avoidance of costly as well as lengthy litigation and the adequate and timely compensation of injured persons.

The no-fault concept has been raised by social thinkers in industrialized countries on the grounds that non-work-related accidents could be considered as much a social risk as work-related ones. Compensation should be available for all those suffering accidents except in very rare circumstances when the victim is negligent. This system also has the advantage of delivering compensation more rapidly to the injured person. This concept means that compensation is available without having to prove the guilt of any party. However, it does not exclude per se the possibility of suing a responsible party. A decision to abolish totally or partly the right to sue or subrogation has to be made along with the decision to implement the no-fault concept. International experience tells us that the compensation cost should be borne by those generating the risk in order to meet objectives of equity in contribution rates and appropriate incentive to prevention. Thus, the implementation of such a system would not avoid the burden of determining the cause of an accident, for example, work-related, transport or other. International experience shows that it is valid to incur administrative costs for proper allocation of compensation costs in order to finance the schemes according to sound principles.

Even though data were not available to make a precise assessment of the financial impact of the 24-hour protection against accidents, rough estimates have been made by using information available for accidents of the IS scheme and national data for transport accidents, as well as information from international experience. The cost of non-work-related accidents in Malaysia would be between 1 and 1.5 times the current cost of the EI branch. It is recommended that SOCSO work in close collaboration with the Department of Statistics in Malaysia to build a reliable database. It should be kept in mind that adoption of intensive prevention programmes goes hand in hand with the establishment of 24-hour coverage. The risk of occurrence of accidents must be minimized as much as possible. An extension of coverage should be accompanied by improved prevention and enforcement of regulations. High-level authorities must agree to provide resources needed for an exhaustive feasibility study.

4. INVESTMENT

An annual real rate of return on investment of 2.5 per cent, the same rate adopted in the previous actuarial valuation, is assumed in the current valuation.

The expected long-term real rate of return for each asset category is estimated and the current asset allocation strategy, as described in the investment policy, is maintained in the future. The asset allocation on the valuation date is conservative, with over 85 per cent of invested assets allocated to fixed-income securities, including 37 per cent allocated to money market instruments. This conservative policy should produce, in the long term, more stable and lower rates of return than those expected under more typical asset allocation strategies. The actual rates of return of SOCSO over the last several years confirm these patterns; for the ten-year period ending on the valuation date, the annualized real rate of return on SOCSO's assets has been 2.54 per cent.

Several changes to the investment policy could be considered with the objective of enhancing expected future returns without significantly increasing the risks of the overall portfolio, as follows:

- ✓ a significant reduction in the allocation to short-term instruments (typical allocation would be 5 per cent or less);
- ✓ an increase of equity investments (typical allocation would be 30–35 per cent);
- ✓ an increase of inflation-sensitive asset categories (e.g. gradual increase to 10–15 per cent);

- ✓ an increase of foreign equities; and
- ✓ an increase of high-quality corporate bonds.

It is recommended that the target asset allocation, in addition to the minimum and maximum allocations currently included in the investment policy, should be also included in the investment policy.

5. MEASURES TO DEAL WITH THE FINANCIAL SITUATION

Allocation of the investment income and the administrative expenses by branch

The investment income should be allocated to each branch in proportion to the size of each fund of each branch; and the administrative expenditure in proportion to the workload of each branch. It is recommended that an expense analysis be performed in order to have better insight of the structure of the administrative expenditure.

Contribution rates for each branch and the treatment of the free reserve in the EI branch

Various scenarios concerning the contribution rates for each branch and the treatment of the free reserve of the EI branch have been analysed.

Setting aside uncertainties about the application of the investment policy, the extension of EI coverage to foreign workers and the 24-hour coverage, a clear financing plan for both branches should be adopted. It is recommended to maintain the current contribution rate of 1.25 per cent for the EI branch. As there is still uncertainty in the cost trend, a decrease would be premature and imprudent. Adequacy of protection, especially regarding medical care, should be thoroughly analysed.

It is also recommended to partially or totally transfer the free reserve in the EI branch to the IS branch. However, this alone does not solve the financing problem of SOCSO. It is recommended to increase the contribution rate of the IS branch from the current 1 per cent to 1.5 per cent in 2018.

It is recommended that SOCSO select one of the following options for the financing policy of the IS branch:

Option 1: A minimum of the funding ratio – namely the ratio of end-of-the-year assets to annual expenditure – is set, and increases in the contribution rate are scheduled at specific intervals in order to prevent the funding ratio from falling below the minimum level.

Option 2: Increases in the contribution rate are scheduled at specific intervals in order to maintain the assets above a given percentage of the technical reserve equal to the liabilities of pensions in payment.

Option 1 is common in the financing of scaled premium systems, while Option 2 caters for better transparency in disclosing liabilities of pensions in payment of the IS branch. In either case, it is recommended to disclose, in the notes to the financial statements, liabilities of pensions in payment of the IS branch.

INTRODUCTION

Article 82 of the Employees' Social Security Act stipulates that a periodic actuarial review should be carried out at least at intervals of five years and at such times as the Minister of Human Resources may consider necessary, and that the report shall be submitted to the Minister. The ILO carried out the last actuarial valuation of the Social Security Fund (the ninth) in 2011. SOCSO therefore requested the ILO to carry out the tenth actuarial valuation of the Social Security Fund as of December 2014.

Statistical data and information for this valuation have been obtained via electronic transfers between SOCSO staff and the actuaries. Subsequently, the model of the Financial, Actuarial and Statistics Services Branch (SOC/PFACTS) of the ILO was used to prepare the demographic and financial projections associated with the actuarial review.

The report has been structured as follows:

- Section 1 presents a review of the experience of the five-year period from 1 January 2010 to 31 December 2014.
- Section 2 describes the projection of the general population and the macroeconomic framework used for the valuation.
- Section 3 presents the projections of the Employment Injury Scheme.
- Section 4 presents the projections of the Invalidity and Survivors' Benefits Scheme.
- Section 5 presents the financial projections and possible measures to deal with the financial situation.
- Section 6 deals with other issues requested by SOCSO in conjunction with the actuarial valuation, and recommendations on financial matters.
- The appendices contain a summary of key SOCSO contribution and benefit provisions, a description of the methodology used for the valuation, key data inputs, assumptions and supplementary information on investment.

1

REVIEW OF THE EXPERIENCE OF THE SOCSO SCHEME

This section discusses the evolution of the financial situation in the intervaluation period from 2010 to 2014. SOCSO's audited financial statements present detailed information for each of the two branches of the social security scheme: employment injury benefits and invalidity and survivors' benefits.

1.1 AMENDMENTS SINCE THE LAST ACTUARIAL REVIEW

The following modifications have been introduced in the legislation since the last actuarial review.

Extension of coverage

On 1 January 2013, employees insured against the contingencies of employment injury and invalidity: All employees who have not attained 60 (instead of 55) years of age are required to contribute except those who have attained 55 years of age and have made no prior contributions before they reach 55 years.

On 1 January 2013, employees insured only against the contingencies of employment injury: All employees who have attained 55 years of age in respect of whom no contributions have been paid before attaining 55 years are required to contribute.

On 1 June 2013, employees of the Federal and State Government who are employed as temporary or contract employees are liable under the Act.

The maximum insurable wage will be increased to MYR 4,000 as of 1 June 2016 and the projections consider this change.

Employment injury benefits

Temporary disablement benefits

On 1 January 2014, increase of the minimum temporary disablement pension from MYR 10.00 to MYR 30.00 per day.

Permanent disablement benefits

On 1 January 2014, increase of the minimum permanent disablement pension from MYR 10.00 to MYR 30.00 per day.

Dependants' benefits

On 1 January 2014, increase of the minimum dependants pension from MYR 10.00 to MYR 30.00 per day.

Constant attendance allowance

On 1 January 2013, increase of the allowance to MYR 500.00 per month (instead of the minimum between 40 per cent of the invalidity pension and MYR 500.00).

Invalidity and survivors' benefits

Qualifying conditions

On 1 January 2013, under 60 years of age (instead of 55) at the time the invalidity notice is received.

Invalidity pension and survivors' pension

On 1 January 2012, increase of the minimum pension rate from MYR 250 to MYR 475.00 per month.

Survivors' pension qualifying conditions

On 1 January 2013, the insured person must have died before attaining 60 years of age (instead of 55).

Constant attendance allowance

On 1 January 2013, the allowance is MYR 500.00 per month (instead of the minimum between 40 per cent of the invalidity pension and MYR 500.00).

1.2 EXPERIENCE FROM 1 JANUARY 2010 TO 31 DECEMBER 2014

Income and expenditure

Table 1.1 summarizes the income and expenditure accounts of the scheme. It covers the individual years of the intervaluation period 2010–14.

Table 1.1 Summary of SOCSO income and expenditure accounts, 2010–14 (MYR '000)

		2010	2011	2012	2013	2014
Income	Contributions[1]	2 007 867	2 172 035	2 325 322	2 518 140	2 688 575
	Investment income[2]	879 630	1 032 552	966 891	1 040 842	1 598 585
	Adjustments[3]	-8 842	3 514	-4 911	22 448	16 061
	Other income	20 482	28 865	31 231	31 945	32 269
	Total income	**2 899 137**	**3 236 966**	**3 318 533**	**3 613 375**	**4 335 490**
Expenditure	Benefit expenditure	1 692 258	1 728 657	2 020 620	2 222 738	2 488 025
	Administration	238 836	279 737	294 269	335 879	396 206
	Total expenditure	**1 931 094**	**2 008 394**	**2 314 889**	**2 558 617**	**2 884 231**
Surplus		**968 043**	**1 228 572**	**1 003 644**	**1 054 758**	**1 451 259**

Notes: [1] Contributions are recorded on cash basis. [2] Refers to realized investment income. [3] Includes reversal of gains/(losses) of impairment for investment in bonds, book values of shares and unrealized foreign exchange.

Source: SOCSO Annual Reports.

Contribution income increased steadily from 2010 to 2014. The average annual percentage increase over the period was 7.6 per cent compared to 2.9 per cent for the number of active insured. The remaining increase in contribution income comes from the wage increases. Investment income increased sharply in 2014 due to capital gains on equities (29.03 per cent investment return in 2014 on equities). It should be noted that investment income has become, over the years, increasingly significant as a percentage of total income.

Benefit expenditure increased continuously over the period. The average annual percentage increase was 10.1 per cent, with a particularly sharp increase from 2011 to 2012 due to benefit improvements. Administrative expenditure increased annually by 13.5 per cent over the period.

Total income increased over the period with a noticeable peak in 2014. A steady increase in the total expenditure continued over the period. In consequence, the surplus of income over expenditure has fluctuated considerably given that income and expenditure growth rates were different.

Tables 1.2 and 1.3 provide a breakdown of the figures in table 1.1 by individual branch, i.e. the Employment Injury Benefits branch and Invalidity and Survivors' Benefits branch. (Table 1.1 includes

Table 1.2 Income and expenditure, Employment Injury Benefits branch, 2010–14 (MYR '000)

		2010	2011	2012	2013	2014
Income	Contribution	1 104 327	1 194 619	1 278 927	1 384 977	1 478 716
	Investment	483 797	567 904	531 790	572 463	879 222
	Adjustments	-4 863	1 933	-4 031	11 512	7 735
	Other income	11 265	15 876	17 177	17 570	17 748
	Total income	**1 594 525**	**1 780 331**	**1 823 863**	**1 986 522**	**2 383 421**
Expenditure	Benefits	650 012	672 584	753 485	799 157	907 606
	Administration	131 360	153 856	161 848	184 734	217 913
	Total expenditure	**781 372**	**826 439**	**915 332**	**983 891**	**1 125 519**
Surplus		**813 154**	**953 892**	**908 531**	**1 002 631**	**1 257 902**
Allocations	Technical reserve	209 544	245 236	211 869	254 909	324 732
	Contingency reserve	32 085	28 995	20 731	28 309	33 304
	Free reserve	571 525	679 661	675 931	719 413	899 866

Table 1.3 Income and expenditure, Invalidity and Survivors' Benefits branch , 2010–14 (MYR '000)

		2010	2011	2012	2013	2014
Income	Contribution	903 540	977 416	1 046 395	1 133 163	1 209 859
	Investment	395 834	464 649	435 101	468 379	719 363
	Adjustments	-3 979	1 581	-3 298	9 419	6 328
	Other income	9 217	12 989	14 054	14 376	14 521
	Total income	**1 304 612**	**1 456 635**	**1 492 252**	**1 625 336**	**1 950 072**
Expenditure	Benefits	1 042 247	1 056 073	1 267 136	1 423 580	1 580 420
	Administration	107 476	125 882	132 421	151 146	178 293
	Total expenditure	**1 149 723**	**1 181 955**	**1 399 556**	**1 574 726**	**1 758 712**
Allocations	**Invalidity pension fund**	**154 888**	**274 680**	**92 695**	**50 610**	**191 360**

net income from other funds (housing loan, vehicle loan, computer advance and education loan) which is not included in tables 1.2 and 1.3 in years 2012 to 2014).

These tables display more or less the same trends as seen in table 1.1. It should be noted that benefits increased at an annual rate of 8.7 per cent over the period 2010–14 for the Employment Injury Benefits branch compared to 11.0 per cent for the Invalidity and Survivor's Benefits branch. Total expenditure is now 45 per cent higher than the contribution income for the Invalidity and Survivors' Benefits branch, so the branch is increasingly using its investment income to pay out benefits. Moreover, the average surplus over the period 2011–14 has sharply decreased compared to the average surplus over the period 2006–10 for the Invalidity and Survivors' Benefits branch. The same comparison for the Employment Injury Benefits branch shows a steady increase.

Allocation of investment income and administration expenditure by branch

For the purpose of the calculation of reserves, the investment income and the administrative expenditure are allocated to each branch in the same proportion as the contribution income, 55 and 45 per cent respectively for the Employment Injury Benefits branch and the Invalidity and Survivors' Benefits branch. This allocation formula is sound in circumstances when the fund accumulation of each branch and the cost of administering each of them are consistent with the allocation of contributions. Otherwise, there is cross-subsidization.

The usual basis for allocating investment income is the fund of each branch at the beginning of the year. Administrative expenditures in theory should be allocated according to the workload generated by each branch. This can be achieved through analysis of the work done by the operational staff. However, this kind of investigation is rarely a priority in an organization, as it does not add much value to the service provided to workers and employers. In practice, the administrative expenditures are allocated according to financial data that may be representative of the workload. Contribution income is one of these, but benefits expenditure is also widely used. In addition, the cost of administering benefits expressed as a percentage of the monetary amount of benefit is not the same for all branches. For example, per Ringgit of benefit expenditure, the cost of administering short-term benefits is larger than for long-term pensions.

The impact of the actual SOCSO practices of allocation as compared to common practices is that the EI branch technically subsidizes the IS branch, as the proportion of the reserve of the IS branch is less than 45 per cent (namely 36 per cent at 31 December 2014) and is decreasing. The situation regarding the administrative expenditure is less clear and the amounts involved are much smaller than the investment income. Nevertheless, it seems that, should the amount of benefit expenditure be a reasonable base to allocate administrative expenditures (or at least a significant proportion of them), there is some subsidization from the EI branch to the IS branch as more than 60 per cent of benefits expenditure is related to the IS branch while only 45 per cent of benefit expenditure is charged to that branch. These facts indicate that the method of allocation of investment income and administrative expenditure should be reassessed. This will be discussed in Section 5.

Balance sheet

Table 1.4 summarizes the balance sheets of the scheme for the period 2010–14.

On the long-term liabilities side, the table highlights the continuing growth of the Social Security Fund. The average annual percentage increase over the period was 5.5 per cent compared to 7.7 per cent over the period 2005–10. The average annual percentage increase over the period 2010–14 is much lower for the Invalidity pension fund (at 1.5 per cent) than for the total Employment Injury fund (at 8.1 per cent). Moreover, the implicit subsidization from the EI fund to the IS fund actually

Table 1.4 Summary of SOCSO balance sheets, 2010–14 (MYR '000)

	2010	2011	2012	2013	2014
Long-term liabilities					
Employment Injury branch					
Technical reserve	3 846 564	4 091 800	4 320 962	4 575 871	4 900 603
Contingency reserve	309 592	338 587	359 318	387 627	420 931
Free reserve	6 666 165	7 333 273	7 838 081	8 562 534	9 461 700
Total	10 822 321	11 763 660	12 518 361	13 526 032	14 783 234
Invalidity pension fund	7 730 849	7 995 585	7 953 299	8 003 910	8 195 269
Total Social Security Fund	**18 553 170**	**19 759 245**	**20 471 660**	**21 529 942**	**22 978 504**
Other funds[1]	72 054	72 454	64 205	60 681	63 379
Grand total	**18 625 224**	**19 831 699**	**20 535 865**	**21 590 623**	**23 041 882**
Long-term assets					
Fixed assets	543 936	514 581	515 411	497 202	762 160
Construction in progress	5 005	36 381	120 984	308 841	75 783
Investment long-term[2]	9 386 936	8 654 529	9 887 487	9 499 241	10 942 900
Loans[3]	58 348	58 982	61 301	60 468	60 473
Sub-total	**9 994 225**	**9 264 473**	**10 585 183**	**10 365 752**	**11 841 315**
Short-term assets					
Short-term investment	8 498 516	10 469 828	10 261 886	11 623 882	11 652 934
Cash	46 440	44 999	41 870	74 580	50 678
Other debtors	135 026	126 544	115 018	123 695	136 928
(-) Other creditors	-48 984	-74 145	-88 036	-183 918	-164 179
Sub-total	8 630 998	10 567 226	10 330 738	11 638 239	11 676 361
(-) Non-current liabilities			380 055	413 369	475 794
Grand total	**18 625 223**	**19 831 699**	**20 535 866**	**21 590 622**	**23 041 882**

Notes: [1] Includes Loan Funds for Housing, Education, Vehicle and Computer. [2] Bonds are stated at cost, adjusted for amortization of premium or accretion of discount to maturity. Shares are stated at the lower of cost or market value. [3] Amounts outstanding from loans made out of Loan Funds.

alleviates the impact on the Invalidity fund of the excess of benefit and administrative expenditure over the contribution income of that branch.

On the assets side, long-term investments increased 3.9 percent annually over the period 2010–14 with decreases in 2011 and 2013. Short-term investments increased 8.2 percent annually over the period with a small decrease in 2012 and a period of stagnation in 2014. Although long-term and short-term investments fluctuated over the period, total net assets increased steadily, exceeding MYR 23 billion in 2014.

Investment of the Social Security Fund and investment performance

The evolution of the invested portion of the Social Security Fund over the four-year period since the preceding actuarial valuation is presented in table 1.5. This table shows the distribution of invested

Table 1.5 Investment analysis, 2010–14

Category of Investment	Value on 1 January	Percentage distribution	Value on 31 December	Percentage distribution	Investment income	Rate of return
	(MYR '000)		(MYR '000)		(MYR '000)	(%)
Year 2014						
Government and govt. guaranteed securities	8 423 598	40	8 795 104	39	398 071	4.73
Private debt securities	2 037 604	10	2 466 285	11	103 125	4.69
Equities	3 456 696	16	3 017 421	13	820 524	29.03
Money market	7 205 225	34	8 317 024	37	292 925	3.85
Total	**21 123 123**	**100**	**22 595 835**	**100**	**1 614 646**	**7.69**
Source: SOCSO 2014 Annual Report.						
Year 2013						
Government and govt. guaranteed securities	8 192 175	41	8 423 598	40	371 394	4.57
Private debt securities	2 340 484	12	2 037 604	10	100 495	4.70
Equities	3 032 724	15	3 456 696	16	361 466	11.80
Money market	6 583 989	33	7 205 225	34	229 934	3.39
Total	**20 149 372**	**100**	**21 123 123**	**100**	**1 063 289**	**5.30**
Source: SOCSO 2013 Annual Report.						
Year 2012						
Government and govt. guaranteed securities	7 593 843	40	8 192 175	41	357 682	4.64
Private debt securities	2 055 988	11	2 340 484	12	106 103	4.95
Equities	2 819 724	15	3 032 724	15	279 904	10.05
Money market	6 708 377	35	6 583 989	33	218 292	3.34
Total	**19 177 933**	**100**	**20 149 372**	**100**	**961 981**	**5.03**
Source: SOCSO 2012 Annual Report.						
Year 2011						
Government and govt. guaranteed securities	8 258 181	46	7 593 843	40	361 905	4.67
Private debt securities	2 045 912	11	2 055 988	11	106 661	5.34
Equities	2 725 560	15	2 819 724	15	375 365	14.52
Money market	4 855 800	27	6 708 377	35	192 135	3.38
Total	**17 885 453**	**100**	**19 177 933**	**100**	**1 036 066**	**5.74**

Source: SOCSO 2011 Annual Report.

assets by asset category as at the beginning and the end of each year; it also shows the investment earnings credited during the year by asset category as well as the internal rate of return by asset category and for the invested assets as a whole.

It will be seen from table 1.5 that the strategic allocation between the main asset categories have remained relatively stable since the preceding valuation date, with approximately 85 per cent of the assets being invested in fixed-income securities, including short-term instruments. With the gradual decline of interest rates observed over the last several years, returns on fixed-income investments to be recognized annually under the accounting methods currently underlying the preparation of SOCSO's

financial statements are bound to gradually decrease from year to year, as coupon rates available on new investments will most likely be lower than those previously earned under maturing securities, thereby gradually reducing the average investment returns credited to the funds.

The strategic asset allocation adopted for the fund's assets indeed constitutes one of the fundamental strategies underlying the evolution of a funded (partially or totally) institutional programme. Comments will be presented later in this report on alternative strategies that could be considered by SOCSO in an attempt to improve the expected return on invested assets, without necessarily exposing the programme to significant additional risks. The report will also illustrate the effects such alternative investment strategies could have on the future evolution of the programmes.

As to the investment performance per se, table 1.5 shows a nominal rate of return of 7.69 per cent for the year 2014, which is significantly in excess of the rates earned in the preceding three years of 5.30, 5.03 and 5.74 per cent (for 2013, 2012 and 2011 respectively). This significant improvement in return for the year 2014 must however be interpreted with caution, as it was largely triggered by the accounting methods used in determining investment earnings for financial reporting purposes. In effect, for financial reporting on equity investments, capital gains/losses are recognized only when realized upon sale of a security (although such capital gains/losses might typically have developed over several years, i.e. the holding period of the security). During 2014, a significant portion (more than 50 per cent on a book value basis) of the equity portfolio internally managed by SOCSO was sold, triggering very substantial capital gains (close to MYR 600 million) that were fully recognized as investment earnings in 2014. This obviously contributed to a major portion of the return of 29.03 per cent observed for the aggregate equity portfolio in 2014. Without such important capital gains, the overall return of invested assets would have been comparable to levels observed in previous years.

For the four-year period since the last valuation, the geometric rate of return is 5.94 per cent per annum, which is at the level expected for the very conservative asset mix strategy adopted for the invested assets in this observation period.

Table 1.6 presents additional information on historical returns (nominal and real) achieved by the Social Security Fund over the last 20 years. Annual nominal rates of return presented in table 1.6 are slightly below those presented in table 1.5, as they are calculated by dividing the recognized investment income of each year by the average value of the total Social Security Fund in that year. The Social Security Fund exceeds invested assets, as it includes no- (or little-) interest-bearing assets and accrual items in addition to invested assets.

In the case of programmes such as SOCSO's EI and IS, under which benefits and related actuarial liabilities are highly sensitive to price inflation, the return parametre which is most pertinent to the financial evolution of the programmes is the real rate of return (ROR), i.e. the rate of return earned in excess of price inflation. From the empirical data shown in table1.6, the geometric real rate of return achieved over the 20year observation period 1995–2014 is calculated at 3.15 per cent per annum, well above the related actuarial assumption of 2.5 per cent per annum underlying the preceding valuation (and also recommended for the present valuation, as we shall see in Section 2). It is however interesting to note that if we consider only the last ten years (i.e. observation period 2005–14), the geometric real rate of return observed reduces to 2.54 per cent, virtually identical to the actuarial assumption. This observation would tend to illustrate that in the low interest rate environment that has characterized the last several years (and which in the opinion of many, is likely to remain for several years in the future), the realization of the real rate of return in line with the actuarial assumption will become increasingly challenging, if the current asset mix strategy heavily oriented towards fixed-income investments is to be maintained.

For the four-year period since the last actuarial valuation, the real rate of return observed is 3.15 per cent per annum. As already mentioned in connection with the review of nominal rates of return, such la evel must be interpreted with caution, as it is somewhat biased by significant capital gains which have

Table 1.6 Rate of return on the Social Security Fund, 1995–2014 (MYR '000)

Year	Fund on 1 January	Fund on 31 December	Investment income	Rate of return (%)	Inflation rate (%)	Real rate of return (%)
1995	3 860 617	4 463 988	274 001	6.8	3.4	3.3
1996	4 463 988	5 008 952	362 040	7.9	3.5	4.3
1997	5 008 952	5 766 481	347 451	6.7	2.7	3.9
1998	5 766 481	6 678 829	490 389	8.2	5.3	2.8
1999	6 678 829	7 862 805	475 741	6.8	2.8	3.9
2000	7 862 805	8 525 942	531 033	6.7	1.6	5.0
2001	8 525 942	9 448 243	529 710	6.1	1.4	4.6
2002	9 448 243	10 007 201	484 618	5.1	1.8	3.2
2003	10 007 201	11 100 968	511 985	5.0	1.5	3.4
2004	11 100 968	11 952 373	548 730	4.9	1.5	3.3
2005	11 952 373	12 816 466	551 827	4.6	3.0	1.6
2006	12 816 466	14 068 702	592 413	4.5	3.6	0.9
2007	14 068 702	15 437 181	936 025	6.6	2.0	4.5
2008	15 437 181	16 283 064	748 188	4.8	5.4	-0.6
2009	16 283 064	17 582 829	667 383	4.0	0.6	3.4
2010	17 582 829	18 553 170	879 630	5.0	1.8	3.1
2011	18 553 170	19 759 245	1 032 552	5.5	3.2	2.2
2012	19 759 245	20 471 660	966 891	4.9	1.6	3.2
2013	20 471 660	21 529 942	1 040 842	5.1	2.1	2.9
2014	21 529 942	22 978 504	1 598 585	7.5	3.2	4.2

emerged over several years but which were totally recognized in 2014, as per the accounting methods used for financial reporting purposes.

1.3 SUMMARY AND CONCLUSION

(1) The analysis of income and expenditure accounts for the period 2010–14 has shown that the trends over this period were not exceptional.

(2) It should be noted that total expenditure has exceeded contribution income since 2013 for the SOCSO scheme, which means that the scheme is using part of its investment income to pay out expenditure. This situation is mainly caused by the Invalidity and Survivors' Benefits branch, which has total expenditures 45 per cent higher than contribution income.

(3)The average annual surplus allocated to the Invalidity pension fund has sharply decreased from the period 2006–10 to the period 2011–14, falling from MYR 334 million to 152 million.

(4) The allocation of investment income and administrative expenditure by branch using a proportion of contribution income is no longer appropriate and should be reassessed.

(5) The analysis of the balance sheets over the period 2010–14 reveals continuing growth of the Social Security Fund, although the funds by branch have varied at very different paces. The average annual

growth rate of the Invalidity pension fund over that period is 1.5 per cent while it is 8.1 per cent for the EI fund

(6) The investment performance observed over the four-year period since the last actuarial valuation has been in line with expectations, given prevailing economic conditions and investment strategies privileged during the period, including an extremely conservative asset mix strategy with over 85 per cent of invested assets allocated to fixed-income investments with close to 40 per cent in short-term deposits with financial institutions. Despite a very low interest rate environment, the average return during this four-year period stood at 5.94 per cent, thereby resulting in a real rate of return of 3.15 per cent. For an observation period of the last ten years, the real rate of return achieved by the Social Security Fund stood approximately at the long-term assumption of 2.5 per cent used for actuarial valuation purposes.

2

PROJECTED DEMOGRAPHIC AND MACROECONOMIC ENVIRONMENT OF MALAYSIA

The future income and expenditure of the SOCSO scheme will be closely linked to changes in the size and age structure of the population of the country, employment levels, economic and wage growth, inflation, and rates of return on investments. Therefore, in order to estimate future SOCSO finances, a projection of Malaysia's total population and economic activity is required. Demographic projections provide estimates of the size and composition of the labour force, while projections of the gross domestic product (GDP) and the growth of labour productivity are necessary to project the number of workers and their earnings. Population and economic projections are interrelated. They are thus performed together to ensure consistency of results.

Demographic and macroeconomic variables were projected for a period of 50 years, following an analysis of past trends and an estimate of plausible future experience. Population and economic projections are an intermediary step to derive SOCSO's scheme projections.

2.1 POPULATION PROJECTION

The determinants of future population changes are fertility, mortality and net migration. Fertility rates determine the number of births, while mortality rates determine how many, and at what ages, people are expected to die. Net migration represents the difference between the number of people who permanently enter and leave Malaysia.

The last official population census took place in 2010, where the resident population was estimated at 28,588,600.

Fertility

The total fertility rate (TFR) represents the average number of children each woman of childbearing age would have if she had all her children in a particular year. If there is no migration, a TFR of about 2.1 is required for each generation to replace itself. The TFR in Malaysia has declined steadily from 2.93 in 2000 to 2.19 children per woman in 2012, as shown in table 2.1. It has been assumed in this valuation that the age-specific fertility rate of 2.14 in 2010 will gradually decline over a 30-year period to reach the age-specific fertility rate of 1.80 in 2040. This is the medium assumption used by the Department of Statistics in the population projections of Malaysia for the period 2010–40.Thereafter, we assume that the TFR will slightly increase to 1.94 in 2064 in order to mitigate the decline in total population.

Table 2.1 Historical fertility rates in Malaysia, 2000–2012

Year	Total fertility rate
2000	2.93
2001	2.71
2002	2.61
2003	2.49
2004	2.45
2005	2.36
2006	2.30
2007	2.27
2008	2.27
2009	2.25
2010	2.14
2011	2.17
2012	2.19

Source: Department of Statistics of Malaysia.

Mortality

Life expectancy at birth is estimated at 71.9 years for males and 76.6 years for females in 2010. For this valuation, improvements in life expectancy and mortality are assumed to occur in accordance with the assumptions used by the Department of statistics in the population projections of Malaysia for the period 2010–40 and with UN estimates thereafter. Under this pattern of mortality improvements, it is projected that life expectancy at birth will reach 80.9 years for males and 84.5 years for females in 2064.

Migration

For this valuation, net migration is assumed to occur in accordance with the assumptions used by the Department of Statistics in the population projections of Malaysia for the period 2010–40 and is set at zero for the rest of the projection period.

Projected population

Figure 2.1 presents the projected population of Malaysia from 2011–64 separated into three age categories: children (0–14), persons who can potentially be insured under both branches of the SOCSO scheme (15–59) and persons of pensionable age (60 and over). The evolution of the relative size of each age group (notably the slight decrease in the population of children and the increase in the number of persons of pensionable age) illustrates the projected ageing of the population of Malaysia.

Table 2.2 presents detailed population projections. We may observe that the total population will increase steadily from 29,527,800 in 2014 to 42,754,008 in 2064.The number of persons aged 15 to 59 will increase from 19,140,800 in 2014 to 24,788,209 in 2044 and then decrease to 23,395,876 in 2064.

Figure 2.1 rojected population of Malaysia, by age group, 2014–64

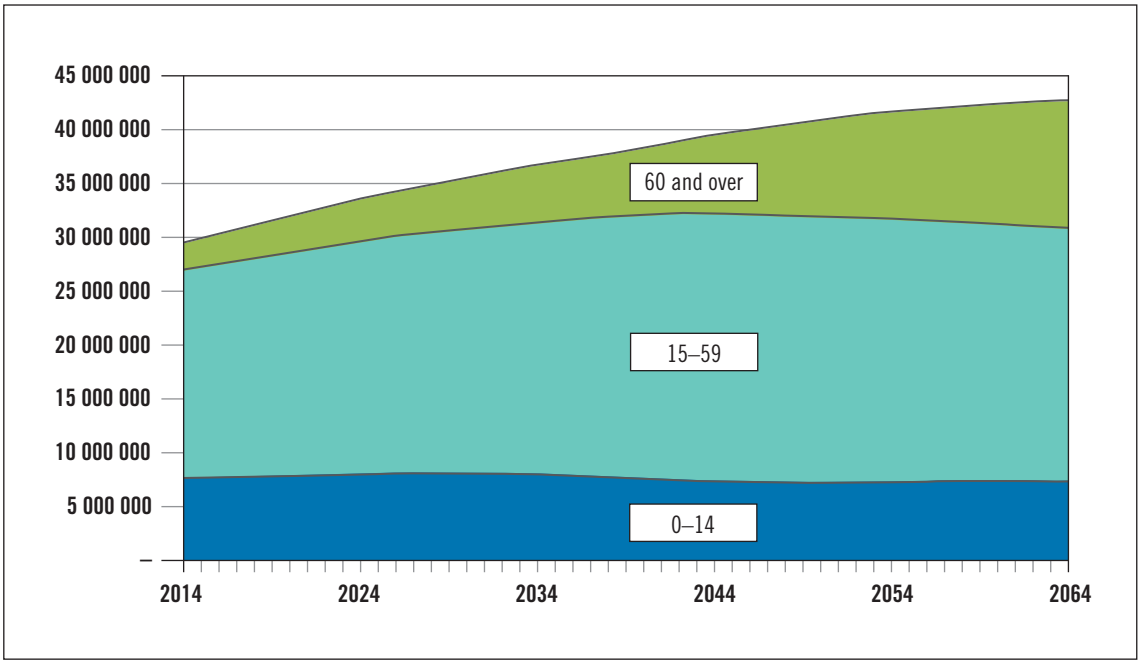


Table 2.2 Projected population of Malaysia, 2014–64

Year	Total	Age		
		0–14	15–59	60 & over
2014	29 527 800	7 734 000	19 140 800	2 653 000
2024	33 585 802	7 960 900	21 602 000	4 022 902
2034	36 754 500	7 949 600	23 352 600	5 452 300
2044	39 536 449	7 312 644	24 788 209	7 435 596
2054	41 679 903	7 310 501	24 277 023	10 092 378
2064	42 754 008	7 339 085	23 395 876	12 019 046

2.2 MACROECONOMIC FRAMEWORK

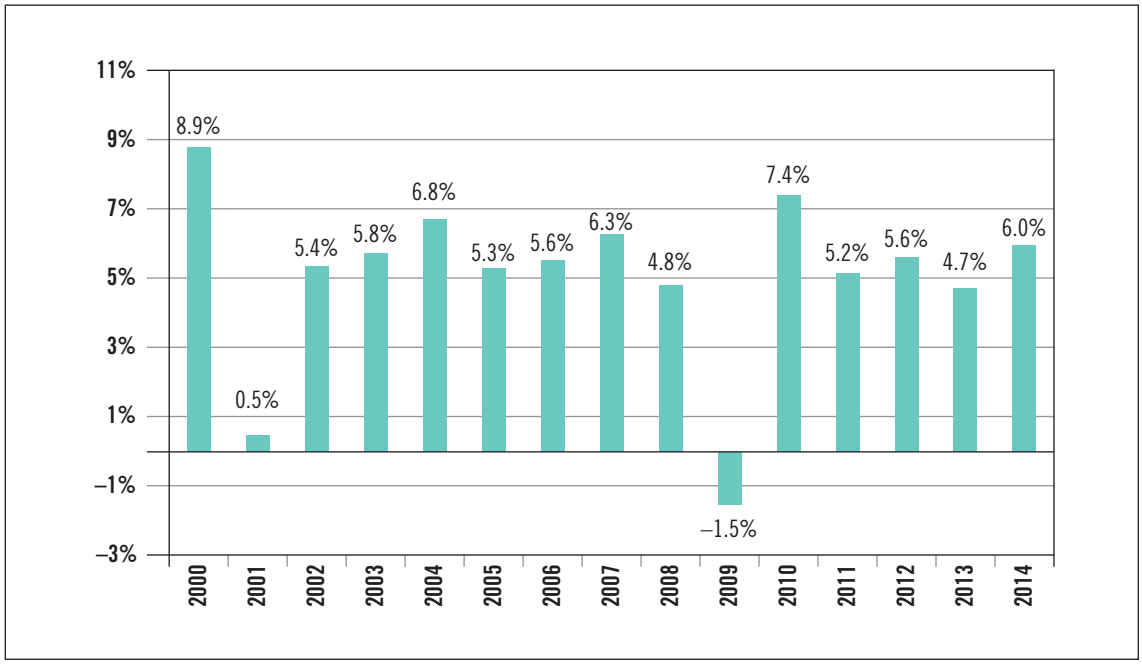
Economic growth

Malaysia is a highly open, upper-middle income economy. The real GDP average growth rate since 2000 is 4.9 per cent (see figure 2.2). The country recovered rapidly from the global financial crisis in 2009, recording growth rates averaging 5.8 per cent since 2009. Growth was driven by strong domestic demand, particularly from increased private investment, and a diversified economic base. Future growth will be driven by the private sector with private investment particularly in the manufacturing and services sectors.

Malaysia's economy will continue to be challenged by uncertainties in the global economy, particularly given the prospect of low prices for crude oil and other major commodities, and the risk of a slowdown in the economies of major trading partners.

According to the International Monetary Fund (IMF), Malaysia's real rate of economic growth is projected at 4.7 per cent in 2015, 4.5 per cent in 2016 and 5.0 per cent from 2017 to 2019. These projections are subject to a commitment to freer trade policies and to the implementation of the reforms

Figure 2.2 Real GDP growth of Malaysia, 2000–2014



Source: Department of Statistics of Malaysia.

envisaged in the Eleventh Malaysia Plan, particularly enhancing the skills of Malaysia's labour force and raising the quality of the educational system and student attainment standards. The long-term real GDP growth assumption is based on international agencies' projections and results in a decrease from 5 per cent in 2020 to 3.5 per cent in 2030, decreasing gradually to 2.4 per cent in 2050 and remaining constant thereafter. The long-term assumption on GDP is the result of assumptions on the future evolution of the labour force, the wage share of GDP and labour productivity, discussed below.

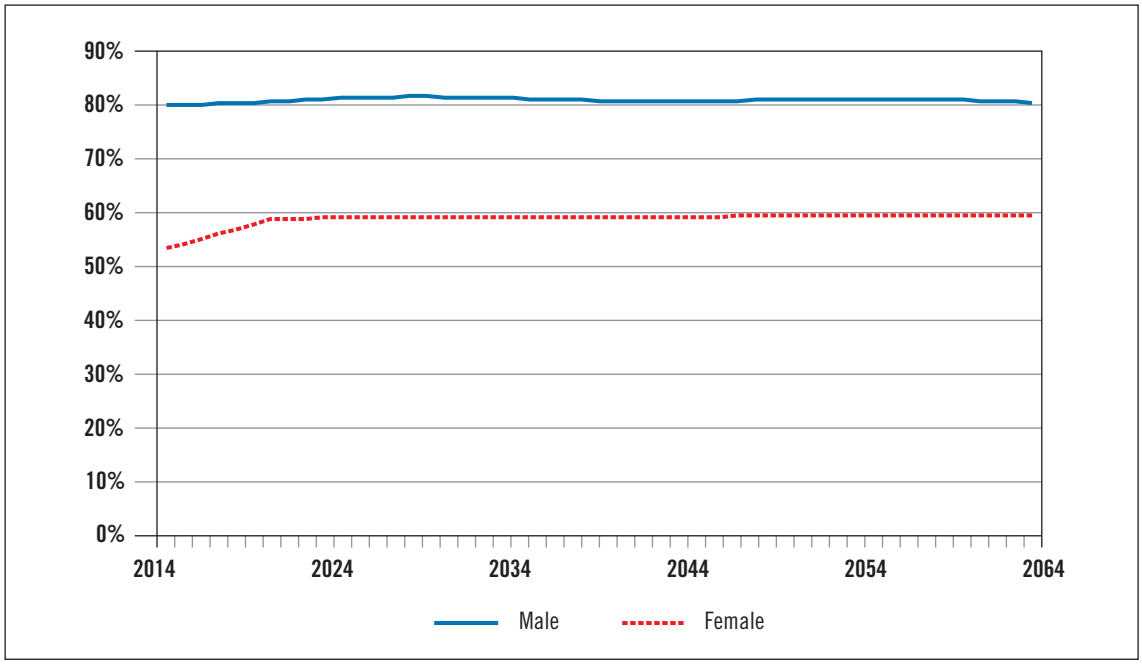
Productivity

Labour productivity over the last four years shows an average annual rate of 2.0 per cent. For 2014, the rate is 3.5 per cent. For the present valuation it is assumed that labour productivity will increase from 2.6 per cent in 2015 to 3.0 per cent in 2020, decreasing from 3.5 per cent in 2021 to 2.2 per cent in 2040 and stabilizing at around 2.5 per cent from 2040 onwards (see table 2.3). The 2016–25 productiv-

Table 2.3 Projected GDP growth, productivity and total employment, 2015–64

Year	Real GDP growth (%)	Increase in productivity per worker (%)	Increase in the number of workers (%)	Labour income share in GDP (%)
2015	4.7	2.6	2.1	34.9
2016	5.0	2.7	2.3	35.6
2017	5.0	2.8	2.2	36.3
2018	5.0	2.9	2.1	36.9
2019	5.0	2.9	2.0	37.6
2024	4.4	3.3	1.1	39.7
2034	3.3	2.5	0.8	40.0
2044	2.7	2.4	0.3	40.0
2054	2.4	2.6	- 0.3	40.0
2064	2.4	2.7	- 0.3	40.0

Figure 2.3 Projected total participation rate, by sex, 2014–64



ity rates are linked to the goal of increasing the share of employees' compensation to 40 per cent of GDP in the Eleventh Malaysia Plan in the short to medium term.

Labour force

For 2015 to 2020, we assumed that the participation rates for men and for women increase in accordance with the goal set in the Eleventh Malaysia Plan. Thereafter, it is assumed that age-specific labour force participation rates will stay constant at the level of 2020 for the entire projection period (see figure 2.3). Under this scenario, the total participation rate will increase from 67.4 per cent in 2014 to 70.2 per cent in 2020 and stay roughly at the same level thereafter. For the male population, the total participation rate will be 80.3 per cent in 2014, 80.8 per cent in 2020 and 80.7 per cent in 2064. The total participation rate of females will increase from 53.6 per cent in 2014 to 59.0 per cent in 2020 and 59.9 per cent in 2064.

Except for year 2009, the unemployment rate has decreased from 3.5 per cent in 2005 to 2.9 per cent in 2014. The unemployment rate is slightly higher for females at 3.2 per cent compared to 2.7 per cent for males. Young people from the age of 15 to 25 years account for about two-thirds of the unemployed.

For 2015 to 2020, we assumed that the unemployment rates for men and for women will vary in accordance with the goal set in the Eleventh Malaysia Plan. Thereafter, it is assumed that age-specific unemployment rates will stay constant at the 2020 level for the entire projection period. Under this scenario, the unemployment rate of 2.9 per cent in 2014 will decrease to 2.8 percent in 2020 and will stay at that level thereafter (see table 2.4).

Inflation

Historically, inflation has been under control with an average annual rate of 2.6 per cent since 1995, as shown in table 2.5. The annual average rate of inflation (ratio of the average CPI for the 12 months of a calendar year to the average CPI of the 12 months of the preceding year) was 2.4 per cent over the last five years.

Table 2.4 Labour market balance, 2014–64 (in thousands)

	2014	2024	2034	2044	2054	2064
Total population	**30 098**	**33 937**	**37 127**	**39 500**	**41 477**	**42 604**
Male	15 465	17 344	18 897	20 037	21 011	21 546
Female	14 633	16 593	18 230	19 462	20 466	21 057
Population 15-64	**20 664**	**23 336**	**25 393**	**27 081**	**26 693**	**25 882**
Male	10 678	12 001	13 071	13 943	13 737	13 328
Female	9 986	11 336	12 322	13 138	12 957	12 555
Labour force 15-64	**13 932**	**16 512**	**17 991**	**19 122**	**18 939**	**18 282**
Male	8 578	9 773	10 650	11 294	11 178	10 760
Female	5 354	6 739	7 341	7 828	7 760	7 522
Participation rate	**67%**	**71%**	**71%**	**71%**	**71%**	**71%**
Male	80%	81%	81%	81%	81%	81%
Female	54%	59%	60%	60%	60%	60%
Employed 15-64	**13 532**	**16 047**	**17 485**	**18 583**	**18 405**	**17 767**
Male	8 350	9 509	10 358	10 986	10 874	10 465
Female	5 182	6 539	7 127	7 597	7 531	7 302
Unemployed	**399**	**465**	**507**	**539**	**533**	**515**
Male	227	265	292	308	304	295
Female	172	200	215	231	229	220
Unemployment rate	**2.9%**	**2.8%**	**2.8%**	**2.8%**	**2.8%**	**2.8%**
Male	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%
Female	3.2%	3.0%	2.9%	2.9%	3.0%	2.9%

Table 2.5 Historical inflation rates in Malaysia, 1995-2014

Period	Inflation rate (%)
1995–99	3.5
2000–04	1.5
2005–09	2.9
2010–14	2.4
1995–2014	2.6

Source: Department of Statistics of Malaysia

Accommodative monetary policy and administrative measures will continue to ensure price stability, so the inflation rate is expected to remain low. It is estimated to stand at 2.5 per cent for the projection period. This projection is in line with the projections of international agencies.

Wage increases

The real wage increase is assumed to gradually converge towards the productivity per worker, as it is expected that wages will adjust to efficiency levels over time. Taking into account the measures

to be implemented to increase productivity in the Eleventh Malaysia Plan, nominal wage increases will be around 7.0 per cent up to 2025 and will decrease gradually to around 5 per cent in 2035 and thereafter.

Rate of return of the Social Security Fund

As previously indicated, for social security programmes such as those run by SOCSO, under which most of the benefits (and related actuarial liabilities) are fully sensitive to price inflation, the return parametre which is most pertinent for actuarial projection purposes is the real rate of return, i.e. the rate of return in excess of price inflation. For the previous valuation as at 31 December 2010, the real rate of return assumption was set at 2.5 per cent per annum.

The methodology traditionally used in the actuarial profession for setting an appropriate return assumption is referred to as the "building block" method. Under this method, a long-term expected rate of return is set for each asset category, and the overall return assumption to be used for actuarial purposes is determined as the weighted average of these expected long-term rates of return: the weight given to each asset category corresponding to the long-term allocation to such asset category under the investment policy adopted for the programme. The long-term expected rate of return for each asset category is determined by adding to the price inflation assumption the real rate of return expected for no-risk investment instruments (i.e. short-term government issues). and for other asset categories, the expected "risk premia" inherent to any such asset category, i.e. remuneration expected by the market investors as compensation for the various risks inherent to the asset category.

For the present valuation, the various risk and return parametres underlying the determination of the return assumption have been comprehensively reassessed, taking into account the evolution of the economic and financial environment since the last valuation, as well as the additional empirical information available from the actual results achieved by the SOCSO funds through the current investment strategies and policies.

We have included in the first part of Appendix 6 of this report detailed information on the process used to determine the long-term expected rate of return for each of the asset categories included in the current investment policy.

The salient end results of the application of this methodology for the present valuation are illustrated in table 2.6:

Table 2.6 Asset allocation and projected long-term return (percentages)

Asset category	Assumed allocation under current asset mix strategy (%)	Expected nominal rate of return (%)	Resulting real rate of return (%, with 2½ % price inflation assumption)
Government securities: conventional & Islamic	38	4.70	2.15
Corporate debt securities: conventional & Islamic	12	5.20	2.64
Domestic equities	12	8.70	6.05
Foreign equities	4	7.50	4.88
Money market instruments	34	3.30	0.78
Weighted average of expected real rate of return based on current asset mix strategy			**2.32**
Assumption used for current actuarial valuation (including gross-up on account of various other factors, as indicated below)			**2.50**

Table 2.6 shows that a crude application of the "building block" approach would produce an expected real rate of return (geometric rate) of 2.32 per cent per annum. There are however various other factors that, although difficult to quantify, should result in an increase of this parametre in future years. First, under SOCSO's methods currently used for financial reporting purposes, significant unrealized gains not yet recognized as investment income are observed on the valuation date; other things being equal and in the absence of changes in accounting methods, such gains will be gradually recognized in future years and should improve returns during a temporary period. Then, a portion of SOCSO's invested assets is managed by external managers under active management mandates, with the objective of over-performing market returns (at least to compensate for the extra management fees inherent to active management). Then, when returns are determined as geometric parametres (as is the case at SOCSO) and when the portfolio is regularly rebalanced to a target asset mix allocation, the cumulative return for the aggregate portfolio will exceed the crude return determined as per the "building block" approach (such effect, which is strictly arithmetical in nature, is referred to as the "diversification/rebalancing" factor). These various factors should in aggregate improve returns by a percentage at least equal to the gross-up percentage included in table 2.6.

In summary, we believe that the real rate of return assumption of 2.50 per cent per annum, which is one of the key assumptions underlying the overall valuation process, is appropriate for the present valuation. In fact, such a level is probably on the prudent side of a realistic range of rates, which is generally considered a desirable characteristic for an actuarial valuation.

It should finally be appreciated that the process described above has been applied assuming, for the future, an asset mix strategy similar to that recently observed for SOCSO's invested assets. This asset mix strategy could indeed be considered as very conservative, being largely oriented towards fixed-income securities, including short-term deposits. Quite obviously, should a more typical asset mix policy be implemented for the SOCSO funds, such alternative strategies could justify the use of a real rate of return assumption significantly higher than the level set above. If the higher expected returns are then realized in the future, this could have a very significant impact on the funding requirements of the programmes; in effect, any additional investment income realized through the investment policy could ultimately result in equivalent reductions in the contribution requirements under the programmes.

In this connection, we are aware that SOCSO is considering some changes to its investment policy for the future. To potentially assist in the process, we have included in Appendix 6 some comments on

Table 2.7 Projected inflation rate, wage increase and rate of return of the Fund, 2015–64

Year	Inflation rate (%)	Annual nominal increase of average wage (%)	Rate of return of the fund (%)
2015	2.1	6.5	4.7
2016	2.5	7.3	5.1
2017	2.5	7.3	5.1
2018	2.5	7.4	5.1
2019	2.5	7.5	5.1
2024	2.5	6.8	5.1
2034	2.5	5.0	5.1
2044	2.5	5.0	5.1
2054	2.5	5.2	5.1
2064	2.5	5.3	5.1

elements which could be considered in this review to enhance returns through better diversification and also through a "risk budget" that could remain acceptable for the programmes' stakeholders. The use of a higher real rate of return assumption could be justified by such alternative asset mix policies. The impact of a favourable scenario of investment return on the main results of this valuation is quantified and presented in section 4.4 (sensitivity test on discount rate).

For this actuarial valuation, the real rate of return is assumed to be equal to 2.5 per cent. Table 2.7 presents the evolution of inflation, average wage growth and gross rate of return that are assumed over the projection period.

3

VALUATION OF EMPLOYMENT INJURY BENEFITS

3.1 INTRODUCTION: PURPOSE OF THE VALUATION

The purpose of the valuation is, first of all, to analyse the progress of the experience during the period since the last valuation. This analysis is conducted with due reference to the financial system applied to the individual benefits. The analysis should lead to an assessment of whether and to what extent the scheme of benefits has lived within the available means, i.e. the contribution rate of 1.25 per cent of insurable salaries. It should also assess the amount of the technical reserve required on the valuation date for future payments of existing benefits and compare it to the amount of the reserve held by the scheme.

Demographic and financial projections are provided for a period of 50 years. During this actuarial review there are ongoing discussions about the extension of the EI scheme to foreign workers. Its impact will be discussed along with related recommendations in Section 6.

3.2 THE FINANCIAL SYSTEMS FOR THE EMPLOYMENT INJURY BENEFITS BRANCH

"Financial system" means the arrangement according to which resources are raised to meet expenditures on benefits and administration. It varies according to the type of benefit, i.e. (a) short-term benefits; and (b) long-term benefits.

Short-term benefits

The short-term benefits of the Employment Injury Benefits branch include medical and rehabilitation benefits, temporary disablement benefits and funeral benefits. The annual expenditure on these benefits in relation to the total insured salary bill is expected to stabilize within a relatively short time after the scheme starts operating. The annual pay-as-you-go (PAYG) system (or the annual assessment system) is the financial system applied to these benefits. Under the PAYG system, the contribution rate is set so that the expected contribution income in a given year equals the expected benefit expenditure in that same year plus a small margin to build up a contingency reserve. The purpose of this reserve is to meet unexpected variations in receipts and expenditure. Its target level has been set equal to the six-month average of benefit expenditure over the three most recent years.

Long-term benefits

Long-term benefits include permanent disablement benefits and dependants' benefits, which are essentially in the form of pensions for life, although they may be partly or fully commuted to a lump

sum under specified conditions.1 The rate of pension depends on the insured salary and, in the case of permanent disablement benefits, on the degree of disability, but does not depend on past service of the individual. In contrast to short-term benefits, the annual expenditure on these long-term benefits in relation to the total insured salary bill is expected to grow continuously for several decades until the scheme attains maturity. The capitalized present value of benefit awards in relation to the insured salary bill is expected to stabilize much sooner.

The financial system applied to these benefits is the terminal funding system, sometimes called the system of assessment of constituent capitals. The contribution rate is set such that the expected contribution income in a given year should equal the capitalized present value of the future benefits awarded in that year. In other words, all the new benefits incurred in a year are fully funded during that year. This leads to the build-up of a technical reserve which, in theory, should at any time be equal to the capitalized value of all pensions in payment so long as the assumptions for the calculation hold. A margin is added in order to constitute a contingency reserve for unexpected variations of income and expenditure. The target level of this reserve has been set equal to the six-month average of capitalized present value of benefit awards over the three most recent years.

Administration costs

Administration costs are covered by adding a loading to the sum of the contribution rates set for short-term and long-term benefits. The determination of administration costs is described in Section 5.

3.3 THE FREQUENCY EXPERIENCE

Table 3.1 shows for the years 2010 to 2014 the number of cases of the principal benefits of the Employment Injury Benefits branch. The number of industrial accidents remained stable while the number of commuting accidents increased significantly.

The frequency of temporary disablement slightly increased. The average duration increased at an average annual rate of 5.7 per cent. The frequency of permanent disablement slightly increased, but the frequency of those receiving a pension decreased from 2.5 to 2.1 per 10,000 insured. The frequency of funeral grants increased while the frequency of those with dependants decreased.

3.4 ANALYSIS OF THE EXPENDITURE ON EMPLOYMENT INJURY BENEFITS

The expenditure of the Employment Injury Benefits branch, during the period 2010-14, is presented in table 3.2. Except for medical benefit, expenditure on all benefits and administrative expenditure increased steadily over the period.

It should be noted that amounts shown in table 3.2 represent the current expenditure on the various items which find their corresponding total in Table 1.2. For valuation purposes, an analysis consistent with the respective financial systems needs to be performed, which is discussed in Section 3.5.

[1] Constant attendance allowances (CAA) are normally considered long-term benefits. However, SOCSO accounting practice treats them as short term benefits. This actuarial valuation applies SOCSO accounting practice.

Table 3.1 Temporary disablement benefit, permanent disablement benefit and dependants' benefit experience, 2010–14

	Numbers					Frequencies (per 10,000 contributors)	
	2010	2011	2012	2013	2014	2010[1]	2014[2]
Reported accidents	57 639	59 897	61 552	63 557	63 331	137.4	125.9
– of which, industrial accidents	35 603	35 088	35 296	35 898	35 294	84.9	70.2
– of which, commuting accidents	22 036	24 809	26 256	27 659	28 037	52.5	55.7
Temporary disablement benefit (TDB)							
– number of terminated cases	48 804	55 785	57 817	59 312	59 190	116.4	117.7
– corresponding benefit days	2 152 080	2 755 888	2 922 026	3 140 657	3 263 058	5 131.0	6 487.0
– average duration (days)	44	49	51	53	55	44.1	55.1
Permanent disablement benefit (PDB)							
– number of awards	13 972	14 817	15 625	16 458	17 353	33.3	34.5
– of which, pension and lump sum	904	832	909	868	843	2.2	1.7
– of which, pension only	120	156	183	233	220	0.3	0.4
Dependants' benefit							
– number of awards	1 077	1 155	1 141	1 194	1 157	2.6	2.3
Funeral grant							
– number of cases	1 041	1 444	1 319	1 412	1 400	2.5	2.8

Notes: [1] The average number of contributors has been taken as 76 per cent of the 2010 active population (5,518,823) = 4,194,305. [2] The average number of contributors has been taken as 81 per cent of the 2014 active population (6,198,657) = 5,030,153.

Source : SOCSO Annual Reports.

Table 3.2 Employment Injury Benefits branch expenditure, by item, 2010–14 (MYR millions)

	2010	2011	2012	2013	2014
Temporary disablement(TDB)	109.2	119.8	135.6	150.3	166.8
Permanent disablement (PDB)	306.4	326.2	363.5	392.8	448.5
Dependants' benefit	205.3	192.6	216.0	219.7	250.4
Constant attendance allowances	3.3	3.4	4.4	3.9	4.6
Medical benefit	5.1	5.3	4.4	4.5	4.7
Physical or vocational rehabilitation	8.9	10.3	12.4	13.8	15.9
Funeral benefit	1.4	1.8	1.7	1.7	1.7
Other expenses	10.4	13.2	15.4	12.6	15.0
Total	650.0	672.6	753.5	799.2	907.6
Administration	131.4	153.9	161.8	184.7	217.9
Total	**781.4**	**826.4**	**915.3**	**983.9**	**1 125.5**

Notes: The respective items include both industrial and commuting accidents. PDB includes lump sums and periodic payments. Other expenses include cost of medical and appellate boards, activities promoting safety and health, penalties written off and general expenditure not elsewhere classified. The individual figures may not add up due to rounding.

Source: SOCSO Annual Reports.

3.5 RETROSPECTIVE COST ANALYSIS

This analysis expresses the relevant expenditure which should be covered by the contributions for each year and for each benefit item, according to the principle of the applicable financial system as a percentage of the corresponding insured salary bill (the relative cost). For short-term benefits, the relevant expenditure corresponds to the current expenditure, as reported in table 3.2. For long-term benefits it corresponds to the capitalized present value of new benefit awards in the year.

Thus, as far as short-term benefits are concerned, the data for this analysis are taken as the benefits expenditures shown in the published income and expenditure accounts seen in table 3.2. As regards long-term benefits such as permanent disablement and dependants' benefits, the relevant expenditure, which is the capitalized value of new awards, is not published in the Annual Report but maintained internally by SOCSO. It is recommended that more information become available in the Annual Report. The data obtained on capitalized values are presented in table 3.3.

The results of the relative cost analysis are presented in table 3.4, which includes the insured salary bill estimated from the contribution income.

Table 3.5 illustrates the trend in the relative costs since 1980 and the difference between the contribution rate and the relative cost, which could be considered as an implied margin.

The relative cost has fluctuated widely in the past. It started to decline at the beginning of the 21st century, but this trend was reversed before the end of the first decade and has been close to 1 per cent in recent years. The deterioration of the experience is mainly related to the increase in commuting accidents.

3.6 PROSPECTIVE COST ANALYSIS

Demographic and financial projections were carried out according to the methodology and assumptions described in Appendix 2 and Appendix 3. It has been assumed that the incidence and severity of temporary and permanent disablement benefits would remain constant over the projection period. The incidence of deaths is assumed to decrease more slowly than the mortality from all causes.

Table 3.3 Capitalized value of new awards, 2006–14 (MYR millions)

Year	Permanent disablement benefit			Dependents' benefits
	Pensions	Lump sums	Total	
2006	52.0	120.2	172.2	165.6
2007	57.7	135.1	192.8	190.4
2008	73.1	158.4	231.5	205.4
2009	92.7	214.5	307.2	210.5
2010	95.8	228.3	324.1	221.3
2011	91.4	252.9	344.3	235.1
2012	100.6	280.4	381.0	222.1
2013	101.7	308.3	410.0	259.7
2014	105.9	345.0	450.9	275.2

Source: SOCSO internal data.

Table 3.4 Retrospective cost analysis for employment injury benefits, 2010–14 (amounts in MYR millions and expressed as a percentage of the insured salary bill)

	2010		2011		2012		2013		2014	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Temporary disablement (TDB)	109.2	0.12	119.8	0.13	135.6	0.13	150.3	0.14	166.8	0.14
Permanent disablement (PDB)	324.1	0.37	344.3	0.36	381.0	0.37	410.0	0.37	450.9	0.38
Dependants' benefit	221.3	0.25	235.1	0.25	222.1	0.22	259.7	0.23	275.2	0.23
Constant attendance allowances	3.3	0.00	3.4	0.00	4.4	0.00	3.9	0.00	4.6	0.00
Medical benefit	5.1	0.01	5.3	0.01	4.4	0.00	4.5	0.00	4.7	0.00
Physical or vocational rehabilitation	8.9	0.01	10.3	0.01	12.4	0.01	13.8	0.01	15.9	0.01
Funeral benefit	1.4	0.00	1.8	0.00	1.7	0.00	1.7	0.00	1.7	0.00
Other expenses	10.4	0.01	13.2	0.01	15.4	0.02	12.6	0.01	15.0	0.01
Total	683.7	0.77	733.2	0.77	777.1	0.76	856.4	0.77	934.8	0.79
Administration	131.4	0.15	153.9	0.16	161.8	0.16	184.7	0.17	217.9	0.18
Total	**815.1**	**0.92**	**887.1**	**0.93**	**938.9**	**0.92**	**1 041.1**	**0.94**	**1 152.7**	**0.97**
Estimated Insured salary bill	88 346		95 570		102 314		110 798		118 297	

Note: PDB includes capital values of pension awards and lump sum payments during each year.

Source: Table 1.2, table 3.2 and SOCSO internal data.

Table 3.5 Trend in relative costs, 1981–2014 (percentage of the insured salary bill)

Year	Relative cost (%)	Margin
1981	0.43	0.82
1986	0.68	0.57
1991	0.73	0.52
1996	1.07	0.18
2001	1.02	0.23
2002	1.02	0.23
2003	0.84	0.41
2004	0.84	0.41
2005	0.85	0.40
2006	0.73	0.52
2007	0.78	0.47
2008	0.82	0.43
2009	0.94	0.31
2010	0.93	0.32
2011	0.93	0.32
2012	0.92	0.33
2013	0.94	0.31
2014	0.97	0.28

Table 3.6 Demographic projections, Employment Injury Benefits branch, 2014–64 (pensioners and temporary disablement)

Year	Average number of contributors[1]	Numbers				% per active insured			
			Dependants				Dependants		
		PD pensions	Widow (ers)	Other dependants	TDB	PD pensions	Widow (ers)	Other dependants	TDB
2014	5 030 153	20 240	12 712	30 094	59 190	0.40	0.25	0.60	1.18
2015	5 128 530	20 980	13 298	32 252	60 250	0.41	0.26	0.63	1.17
2016	5 238 928	21 713	13 880	32 658	61 478	0.41	0.26	0.62	1.17
2017	5 513 272	22 451	14 459	33 169	64 720	0.41	0.26	0.60	1.17
2018	5 623 493	23 215	15 051	33 875	65 974	0.41	0.27	0.60	1.17
2019	5 731 970	24 006	15 654	34 651	67 215	0.42	0.27	0.60	1.17
2020	5 837 414	24 804	16 255	35 456	68 435	0.42	0.28	0.61	1.17
2021	5 913 358	25 607	16 853	36 294	69 449	0.43	0.29	0.61	1.17
2022	5 983 567	26 416	17 448	36 901	70 412	0.44	0.29	0.62	1.18
2023	6 048 429	27 229	18 038	37 450	71 327	0.45	0.30	0.62	1.18
2024	6 109 950	28 045	18 622	37 785	72 208	0.46	0.30	0.62	1.18
2029	6 368 063	32 148	21 434	38 111	76 081	0.50	0.34	0.60	1.19
2034	6 591 406	36 247	24 001	36 922	79 547	0.55	0.36	0.56	1.21
2039	6 796 648	40 318	26 257	35 973	82 722	0.59	0.39	0.53	1.22
2044	6 931 416	44 255	28 194	34 728	85 005	0.64	0.41	0.50	1.23
2054	6 884 916	50 843	31 190	32 364	85 320	0.74	0.45	0.47	1.24
2064	6 630 463	55 171	32 742	30 217	82 740	0.83	0.49	0.46	1.25

Note: [1] Average number of contributors: active contributors x density.

Table 3.6 presents the demographic projections for the long-term benefits (number of disablement and survivors pensioners at the end of each year) and the temporary disablement benefits. The demographic ratio is the ratio of the number of pensioners to the number of active insured at risk. The latter is obtained by multiplying the number of active contributors by the density factor.

As the system is not yet fully mature, an increase in the demographic ratio of long-term benefits is expected in the context of a stable frequency of injuries. The number of new awards then exceeds the number of exits. A change in the demographic ratio of temporary disablement benefits, often used as a basic indicator of the frequency of injuries (see table 3.1), indicates a change in the distribution of the population by sex and age.

Table 3.7 presents another set of demographic projections related to benefit awards.

Table 3.8 presents the financial projections for employment injury benefits according to the financing system applicable for each of them.

Table 3.7 Demographic projections, Employment Injury Benefits branch, benefit awards, 2014–64 (pensions and funeral benefits)

Year	Average number of contributors[1]	PD pensions	PD lump sums	Dependants		Funeral benefits
				Widow(er)s	Other dependants	
2014	5 030 153	1 063	16 290	689	2 630	1 400
2015	5 128 530	1 127	16 874	699	2 714	1 388
2016	5 238 928	1 148	17 206	704	2 702	1 384
2017	5 513 272	1 172	17 583	711	2 698	1 385
2018	5 623 493	1 238	18 557	743	2 773	1 427
2019	5 731 970	1 263	18 943	749	2 765	1 427
2020	5 837 414	1 289	19 324	756	2 757	1 427
2021	5 913 358	1 315	19 695	761	2 748	1 425
2022	5 983 567	1 338	20 007	765	2 737	1 421
2023	6 048 429	1 361	20 308	769	2 725	1 416
2024	6 109 950	1 383	20 596	773	2 710	1 410
2029	6 368 063	1 487	21 892	785	2 629	1 374
2034	6 591 406	1 582	23 037	787	2 533	1 337
2039	6 796 648	1 673	24 034	784	2 438	1 313
2044	6 931 416	1 743	24 713	808	2 415	1 338
2054	6 884 916	1 799	24 847	838	2 323	1 347
2064	6 630 463	1 768	24 163	821	2 203	1 288

Note: [1] Average number of contributors: active contributors x density.

Table 3.8 Financial projections, Employment Injury Benefits branch, 2014–64 (MYR millions, costs reported according to the funding method)

Year	Insured salary bill	PD pensions	PD lump sums	Dependants		Funeral grants	TD	Other[1]	Total	Total as % of insured salary bill
				Widow (ers)	Orphans and parents					
2014	117 836	106	345	172	103	2	167	44	939	0.80
2015	128 698	117	368	185	114	2	181	48	1 015	0.79
2016	150 720	127	412	199	121	2	211	53	1 124	0.75
2017	178 501	148	466	232	136	2	249	59	1 294	0.72
2018	195 920	175	534	274	156	2	273	65	1 479	0.75
2019	214 973	192	585	297	166	3	298	71	1 612	0.75
2020	235 798	210	641	321	177	3	327	78	1 756	0.74
2021	256 057	229	700	347	189	3	355	84	1 907	0.74

Table 3.8 continued on page 36

Table 3.8 continued from page 35

Year	Insured salary bill	PD pensions	PD lump sums	Dependants		Funeral grants	TD	Other[1]	Total	Total as % of insured salary bill
				Widow (ers)	Orphans and parents					
2022	277 609	249	761	373	201	3	386	91	2 063	0.74
2023	300 483	270	825	400	213	3	418	99	2 228	0.74
2024	324 669	293	894	429	225	4	453	107	2 404	0.74
2029	450 838	415	1 263	580	285	5	637	150	3 334	0.74
2034	600 248	559	1 695	741	345	6	859	200	4 406	0.73
2039	783 856	738	2 225	926	417	7	1 134	263	5 711	0.73
2044	1 014 613	962	2 881	1 191	523	10	1 481	342	7 390	0.73
2054	1 668 880	1 592	4 737	1 992	824	16	2 459	562	12 183	0.73
2064	2 695 781	2 587	7 674	3 242	1 274	25	4 008	908	19 718	0.73

Notes: The cost of PD pensions and dependants' benefits is the present value of pensions awarded during the year. For all other benefits, the cost is the payments made during the year.

[1] Includes medical benefits, physical and vocational rehabilitation, constant attendance allowances, activities promoting safety and health, penalties written off and general expenditure not elsewhere classified.

The cost of benefits is fairly stable, remaining between 0.73 and 0.79 per cent of the insurable salary bill. This is not a forecast, but an illustration of the financial results if the assumptions are realized in the future. The occurrence of work-related accidents and the severity of injuries depend on several factors, including the industry mix, the safety conditions in workplaces and on the road, the behaviour of workers both at the workplace and in transport. The forecast of long-term changes in those factors is beyond the scope of this actuarial analysis.

Table 3.9 presents the projections of the technical reserve calculated at the end of each year by using the projected number of pensioners, their average amount of pensions at the end of each year and the annuity factors defined by regulation. This is a prospective calculation. It would differ from the result reported in the financial statements, which is calculated retrospectively and depends on the actual benefits paid and investment returns realized by the fund. Consistency between the two results is checked at each actuarial valuation, and if the discrepancy is material an adjustment to the financial statements should be made. The prospective approach gives more adequate information on benefits liabilities.

The contingency reserve is based on the projected benefits expenditure and the capitalized present value of benefits awarded.

In principle, it is not possible to project the free reserve before completing the analysis of the Invalidity and Survivors (IS) branch because the investment income allocated to the Employment Injury (EI) branch depends on the investment income of both branches. It is known from previous valuations that the contribution rate for the IS branch is not sufficient. If no action is taken to address IS branch financing, this will have an impact on the EI fund, as the assets would be used to pay benefits and would not be available to generate investment income to feed the EI reserves.

The ratio of the technical reserve over the long-term benefits expenditure varies slightly over the projection period. This reflects the change in the profile of pensioners.

Table 3.9 Projected required prospective technical reserve and contingency reserve, 2014–64 (MYR millions)

Year	Technical reserve	Contingency reserve	Ratio : Technical reserve/ Long-term benefits
2014	4 538	421	11.9
2015	4 841	460	11.6
2016	5 180	503	11.6
2017	5 570	562	10.8
2018	6 032	638	10.0
2019	6 557	718	10.0
2020	7 125	794	10.1
2021	7 736	864	10.1
2022	8 400	938	10.2
2023	9 111	1 015	10.3
2024	9 875	1 096	10.4
2029	14 470	1 544	11.3
2034	20 405	2 051	12.4
2039	27 861	2 667	13.4
2044	37 219	3 445	13.9
2054	64 483	5 697	14.6
2064	107 756	9 235	15.2

3.7 VERIFICATION OF THE TECHNICAL RESERVE ON VALUATION DATE 31 DECEMBER 2014

An independent computation of the technical reserve has been carried out on the basis of data on the beneficiaries of PD and survivors' pensions as of the valuation date (number and pension amounts). The results are presented in table 3.10.

The annuity factors defined by regulation are used in determining the present value of pensions (see more in section 3.8). The annuity factors for permanently disabled pensioners are defined up to the age group 65–69. For pensioners above 69, the factors for the survivors reduced by 16 per cent have been used to take into account the shorter life expectancy of disabled pensioners.

Table 3.11 presents a summary of the results.

The technical reserve reported on the SOCSO balance sheet, however, is MYR 4,900,603.This reserve exceeds the computed amount by about 8 per cent. The same phenomenon was observed in previous valuations and seems to follow a decreasing trend, as the excess was 21 per cent in the eighth valuation and 15 per cent in the ninth valuation. The gap is narrowing.

The main explanation of the gap is that a retrospectively determined technical reserve cumulates in its value all past gains and losses on assumptions used in defining the annuity factors, while a

Table 3.10 Verification of the technical reserve at valuation date, 31 December 2014

	PD				Widow(er)s				Parents			
	Number	Average monthly pension (MYR)	Annuity factor	Technical reserve (MYR '000)	Number	Average monthlypension (MYR)	Annuity factor	Technical reserve (MYR '000)	Number	Average monthly pension (MYR)	Annuity factor	Technical reserve (MYR '000)
0–19	23	467	8 973	3 165	7	856	9 756	1 920	-	-	-	-
20–24	327	409	8 530	37 448	74	714	9 346	16 222	-	-	-	-
25–29	1 058	423	8 029	118 103	396	794	8 893	91 854	-	-	-	-
30–34	1 779	420	7 479	183 414	818	790	8 387	178 117	-	-	-	-
35–39	2 310	446	6 876	232 547	1 270	717	7 817	233 836	8	262	7 817	539
40–44	2 874	447	6 221	262 801	1 609	705	7 189	267 971	200	257	7 189	12 142
45–49	2 900	448	5 538	236 170	1 771	769	6 509	291 324	759	262	6 509	42 583
50–54	2 786	444	4 880	198 388	1 833	833	5 796	290 902	1 678	297	5 796	94 996
55–59	2 400	451	4 238	150 773	1 690	835	5 056	234 531	2 365	329	5 056	129 309
60–64	1 806	450	3 637	97 053	1 373	779	4 341	152 453	2 325	361	4 341	119 650
65+	1 977	408	2 718	72 043	1 871	693	3 134	133 489	4 061	390	2 978	155 036
Total	**20 240**	**439**	**5 450**	**1 591 905**	**12 712**	**766**	**5 919**	**1 892 619**	**11 396**	**347**	**4 267**	**554 254**
	Orphans				**Siblings**				**GRAND TOTAL**			
	15 209	**436**	**2 164**	**470 854**	**3 489**	**199**	**1 221**	**27 911**	**63 046**			**4 537 543**

Table 3.11 Technical reserve required at 31 December 2014

Type of pensioner	Technical reserve
Permanent disablement	1 591 905
Widows (widowers)	1 892 619
Orphans	470 854
Parents	554 254
Siblings	27 911
Total	**4 537 543**

prospectively determined technical reserve does not. The observed excess means that deviations from assumptions have resulted in net gains. The three principal sources of gain for the retrospectively determined technical reserve are: (1) indexation of pension less frequent than annual; (2) the difference of investment rate of return minus indexation rate greater than the assumed real rate of return (3 per cent); and (3) the pension termination rate higher than assumed. Of course, the opposite of these relationships would result in a loss. Since there were gains from sources (1) and (2) during the 2011–14 period, an increase in the relative excess should have been observed.

In order to assess the reasonableness of the technical reserve, the present value of pensions in payment has been computed with the ILO model using the assumptions of the base scenario. The resulting technical reserve is MYR 5,659,208. This indicates that the annuity factors of schedule II are too low.

3.8 ACTUARIAL PRESENT VALUE FACTORS

The actuarial present value factors contained in regulations 84 and 126 are used for the calculations of the technical reserve. They are also used for the purpose of commuting periodical payments into lump sums. The current factors were adopted in 1983 following the recommendation in the ILO report of the second actuarial review of SOCSO. The interest rate of the factors is a nominal rate of 7.5 per cent per annum combined with an assumed inflation rate of 4.5 per cent per annum, implying a real interest rate of about 3 per cent per annum.

For illustration, actuarial present values have been computed based on the mortality, nominal interest and inflation rates used for this valuation. As mortality is assumed to improve over time, the factors theoretically reflect the situation of pensions awarded in 2015 only. Thereafter, they should be slightly higher every year to take into consideration the improvement in mortality. Two scenarios have been considered as regards the frequency of pension adjustment for the cost of living: (a) annual adjustment of pensions; and (b) adjustment once every four years. Table 3.12 presents a comparison of the actuarial present value factors under these two bases to the current factors.

Factors are calculated separately for each sex and averaged according to the weight of males and females among the new pensioners in 2014 to obtain the unisex factors.

It seems that the current factors are too low, due to the increase in life expectancy since their adoption. However, there is much uncertainty regarding the mortality and the recovery of permanent disability pensioners as it has not been possible to undertake a detailed analysis of them in this valuation. Nevertheless, it is interesting to examine the impact of applying the revised factors to the projected cost of the employment injury scheme shown in table 3.8.

Table 3.12 Actuarial present value factors

Age	Current factors	Annual adjustment		Four-yearly adjustment	
		Revised factors(a)	Ratio to current factor	Revised factors(b)	Ratio to current factor
PDB factors					
17	8 973	10 412	1.16	10 048	1.12
22	8 530	10 000	1.17	9 651	1.13
27	8 029	9 447	1.18	9 117	1.14
32	7 479	8 816	1.18	8 510	1.14
37	6 876	8 174	1.19	7 891	1.15
42	6 221	7 490	1.20	7 232	1.16
47	5 538	6 774	1.22	6 541	1.18
52	4 880	6 071	1.24	5 864	1.20
57	4 238	5 335	1.26	5 153	1.22
62	3 637	4 573	1.26	4 419	1.22
67	3 099	3 890	1.26	3 761	1.21
Survivors' factors					
17	9 756	11 712	1.20	11 302	1.16
22	9 346	11 306	1.21	10 910	1.17
27	8 893	10 845	1.22	10 465	1.18
32	8 387	10 328	1.23	9 967	1.19
37	7 817	9 728	1.24	9 389	1.20
42	7 189	9 055	1.26	8 740	1.22
47	6 509	8 270	1.27	7 983	1.23
52	5 796	7 488	1.29	7 230	1.25
57	5 056	6 640	1.31	6 411	1.27
62	4 341	5 724	1.32	5 529	1.27
67	3 671	4 766	1.30	4 605	1.25
72	3 020	3 816	1.26	3 689	1.22
77	2 427	3 013	1.24	2 915	1.20
82	1 832	2 401	1.31	2 326	1.27
87	1 256	1 920	1.53	1 862	1.48
92	857	1 466	1.71	1 423	1.66
97	541	839	1.55	818	1.51

If the assumptions underlying the revised factors of table 3.12 are expected to properly capture future values of the demographic and economic variables, then the present value of pensions awarded should be estimated with those factors for the annual cost estimate. As for lump sums, their cost depends on the regulation provisions. For analytical purposes, two alternatives can be envisaged, whether or not regulatory changes are introduced to revise the current factors. Table 3.13 compares the projected cost ratio (cost of benefits to insurable earnings) under the three scenarios regarding actuarial present value factors: (i) current factors used for the calculation of technical reserve and lump sum payments (base scenario);

Table 3.13 Sensitivity of projected cost ratio, 2014–64 (cost of benefits to insurable earnings)

Year	Base scenario	Action in regulation	
		Factors are updated	Factors are not updated
2014	0.80	0.80	0.80
2015	0.79	0.91	0.85
2016	0.75	0.86	0.81
2017	0.72	0.84	0.78
2018	0.75	0.87	0.82
2019	0.75	0.87	0.81
2020	0.74	0.86	0.81
2021	0.74	0.86	0.81
2022	0.74	0.86	0.80
2023	0.74	0.86	0.80
2024	0.74	0.86	0.80
2029	0.74	0.86	0.80
2034	0.73	0.85	0.79
2039	0.73	0.84	0.78
2044	0.73	0.84	0.78
2054	0.73	0.85	0.79
2064	0.73	0.85	0.79

(ii) revised factors used for the calculation of technical reserve and lump sum payments (regulatory change scenario); and (iii) revised factors used for the calculation of technical reserve and current factors used for the calculations of lump sum payments (no regulatory change scenario). Scenario (iii) examines the situation where it is not desirable to maintain the current factors considered obsolete for the purpose of financial projections, but regulatory change to revise the factors is not in the foreseeable future. The lump sums for permanent disablement would continue to be paid according to the current present value factors, while the cost estimate would be based on revised factors considered as more reliable.

The percentages in the last column of table 3.13 provide a valuable indication of the projected cost of the employment injury scheme in the absence of revision of actuarial present value factors in the regulation. It is recommended to implement a data analysis system in order to annually monitor the mortality of each type of pensioner and the recovery of permanent disablement pensioners with a view to revising the factors to be included in the legislation.

3.9 ADJUSTMENT OF PENSIONS FOR THE MAINTENANCE OF THEIR REAL VALUE

The last pension adjustment was made following the recommendation in the ninth actuarial valuation report. This measure adjusted pensions awarded till the end of 2010 to the consumer price level of December 2010. Pensions awarded after the beginning of 2011 were not adjusted in the last pension adjustment.

Table 3.14 Evolution of the consumer price index, 2010–14 (2010 = 100)

Pension award dates	Consumer price index	Increase up to Dec. 2014 (%)
December 2010	101.3	10.4
2011 (average)	103.2	8.3
2012 (average)	104.9	6.6
2013 (average)	107.1	4.4
2014 (average)	110.5	1.2
December 2014	111.8	

Table 3.15 Adjustment of pensions awarded till the end of 2014

Pensions awarded before 2011	10.4%
Pensions awarded in 2011	8.3%
Pensions awarded in 2012	6.6%
Pensions awarded in 2013	4.4%
Pensions awarded in 2014	1.2%

In considering a further adjustment, it is necessary to assess whether there has been a substantial change in the cost of living since 2011. The evolution of the consumer price index (CPI) since 2011 is shown in table 3.14. The last column of the table shows the percentage increases in the cost of living from the pension award dates to December 2014, some of which are substantial.

It is recommended to adjust pensions till the end of 2014 in line with the CPI increase as shown in table 3.15. It is understood that this pension increase requires a substantial amount of clerical work because the operational systems cannot handle the change. SOCSO should give due attention to this limitation in the upgrade of its computer systems.

3.10 CONCLUSIONS AND RECOMMENDATIONS

(1) The overall financial situation of the Employment Injury branch, as of 31 December 2014, was sound. Since the ninth valuation, the cost of the branch has been contained within the current contribution rate of 1.25 per cent of insured wages.

(2) It is recommended that the capitalized value of new awards for permanent disablement pensions and dependants' benefits, which is maintained internally by SOCSO, become available in the Annual Report.

(3) The technical reserve as of 31 December 2014 provided in the balance sheet (MYR 4,900,603) is 8 per cent higher than the reserve calculated with the actuarial present value factors prescribed by the regulations (MYR 4,537,543). However, the technical reserve provided in the balance sheet is 13.4 per cent lower than the technical reserve calculated prospectively on the base of the actuarial assumptions of the tenth valuation (MYR 5,659,208), so it is no longer sufficient to cover liabilities. This situation indicates that the actuarial present value factors prescribed by the regulations are too low. It is recommended to calculate the technical reserve in the balance sheet prospectively with revised actuarial present value factors.

(4) Since the review of the actuarial present value factors prescribed by the regulations has concluded that they are too low, it is recommended to revise them upwards.

(5) It is recommended to implement a data analysis system in order to annually monitor the mortality of each type of pensioner and the recovery of permanent disablement pensioners.

(6) The technical reserve provided in the balance sheet, the contingency reserve and the free reserve all together adequately cover the pension liabilities on the valuation date. The contingency reserve has been provided at the level required and a substantial free reserve has accumulated.

(7) Taking into account the increase in the cost of living since 2011, it is recommended that permanent disablement benefits and dependants' benefits in payment be adjusted to compensate for the loss in purchasing power since the last adjustment or since the date of award, if later. The proposed adjustment rates are as follows:

Pensions awarded before 2011	10.4%
Pensions awarded in 2011	8.3%
Pensions awarded in 2012	6.6%
Pensions awarded in 2013	4.4%
Pensions awarded in 2014	1.2%

These adjustments have been already taken into account in the financial projections and there are sufficient funds to cover them.

(8) It is recommended that the current contribution rate of 1.25 per cent of insured salaries be maintained. The retrospective and prospective cost analyses result in a contribution rate around 1 per cent. The frequencies of reported accidents continued to decrease in 2014 from the 2010 level, while the average duration of the temporary injury benefits has increased. The gap between the current contribution rate and the necessary cost rate has recently narrowed as improvements of the benefits were effected in 2013 and 2014. This gap could diminish again if the actuarial present value factors are revised. It is necessary to closely monitor the trend in the near future. The contribution rate should be again assessed at the next actuarial valuation based on future observations.

4

VALUATION OF INVALIDITY AND SURVIVORS' BENEFITS

4.1 INTRODUCTION

The first step of the valuation is to analyse the past experience of invalidity and survivors' benefits to set the actuarial basis for the valuation.

The second step is to carry out projections, starting from the valuation date and according to the newly established actuarial basis. These projections give an indication of the years when increases in the contribution rate will probably be required. This approach is consistent with the partially funded scaled premium (SP) financial system which is applied to these benefits.

4.2 THE FINANCIAL SYSTEM FOR INVALIDITY AND SURVIVORS' BENEFITS

These benefits are long-term benefits, awarded mainly in the form of pensions which continue in payment throughout the lifetime of the beneficiary (i.e. an invalidity or survivor pensioner) or during a specified status (e.g. an orphan being under the age of 21). Total annual benefit expenditure in the percentage of the insured salary bill is expected to increase continuously over a long period of time until the scheme reaches maturity. Any significant changes in the scheme, such as expansion of coverage or changes in the benefit formula, will extend the scheme maturating process.

In view of the above, there is a variety of possible financial systems for a social security pension scheme, from pay-as-you-go (PAYG) at one extreme to the general average premium system (GAP) at the other. PAYG cost rates continuously increase with practically no reserves. The GAP contribution rate is a flat contribution rate with an accumulation of substantial reserves.

In practice, many social security pension schemes apply an intermediate partially funded system where the contribution rate falls between the PAYG contribution rate and the GAP rate. One of the systems is the terminal funding system (TFS) or the assessment of constituent capitals system which is being applied to permanent disability benefit and dependants' benefits under the Employment Injury Benefits branch. The TFS is a funding system whereby the future full cost of new benefits during the year, i.e. the capitalized present value of new benefits, should be covered by the contributions of that year. In consequence, the accumulated reserve fund together with future investment earnings should fully cover the future cost of pensions already in payment. The TFS system for long-term employment injury benefits is adopted in several countries, since it is considered appropriate to make full provision for compensation of industrial injuries or occupational diseases at the time of occurrence. The rate of pension is a fixed percentage of the wage regardless of the contributory period of the individual.

In contrast, the SOCSO invalidity and survivors' benefits pension formula is proportional to the contributory period within maximum and minimum limits on the replacement rate. In most countries, invalidity and survivors' pensions form a part of a composite scheme including old-age pensions. The general financing practice is to adopt a partially funded system with flat contribution rates over successive intervals to meet a target reserve condition. This financial system is called the scaled premium system (SP).

A variant reserve condition of this system is that the reserve should increase over each interval, reaching a plateau at the end of the interval. The reserve fund would start to decrease if the same contribution rate continued beyond the interval. This variant is applied in several developing countries. Although the scheme intends to use the investment return on funds for benefit payments, it does not use the reserve itself to meet expenditure. This enables the reserves to be invested in long-term assets. The previous actuarial valuations of the Invalidity and Survivors' Benefits branch have been performed on the basis of the scaled premium system. It was also adopted in the present valuation.

Table 4.1 Relative cost analysis for the Invalidity and Survivors' Benefits branch, 2010–14

Item	2010	2011	2012	2013	2014
Amounts (MYR millions)					
Invalidity benefit	345.6	341.0	413.4	453.6	496.8
Survivors' benefit	581.5	583.8	704.3	762.2	834.7
Constant attendance allowance	12.6	13.8	16.5	21.1	37.8
Dialysis	77.8	92.5	104.6	122.8	158.1
Physical or vocational rehabilitation	8.5	7.8	10.1	12.3	14.3
Funeral benefit	11.9	12.6	12.9	15.5	17.3
Health Screening Programme	0.0	0.0	0.0	29.4	16.6
Other expenses	4.5	4.7	5.5	6.7	5.0
Total benefit expenditure	**1 042.2**	**1 056.1**	**1 267.1**	**1 423.6**	**1 580.4**
Administration	107.5	125.9	132.4	151.1	178.3
Total expenditure	**1 149.7**	**1 182.0**	**1 399.6**	**1 574.7**	**1 758.7**
Estimated insured salary bill	89 239	97 742	104 639	113 316	120 986
Relative cost as a percentage of insured salary bill (%)					
Invalidity benefit	0.39	0.35	0.40	0.40	0.41
Survivors' benefit	0.65	0.60	0.67	0.67	0.69
Constant attendance allowance	0.01	0.01	0.02	0.02	0.03
Dialysis	0.09	0.09	0.10	0.11	0.13
Physical or vocational rehabilitation	0.01	0.01	0.01	0.01	0.01
Funeral benefit	0.01	0.01	0.01	0.01	0.01
Health Screening Programme	0.00	0.00	0.00	0.03	0.01
Other expenses	0.01	0.00	0.01	0.01	0.00
Total benefits	**1.17**	**1.08**	**1.21**	**1.26**	**1.31**
Administration	0.12	0.13	0.13	0.13	0.15
Total expenditure	**1.29**	**1.21**	**1.34**	**1.39**	**1.45**

Source: SOCSO financial statements and internal data.

4.3 ANALYSIS OF THE RELATIVE COST EXPERIENCE AND COMPARISON WITH PREVIOUS PROJECTIONS

Table 4.1 presents an analysis of the relative cost experience of the Invalidity and Survivors' Benefit branch over the period 2010–14. The table shows the absolute amounts drawn from the published income and expenditure accounts and the calculated PAYG cost of expenditure.

It is noted that the PAYG cost rate has grown from 1.29 to 1.45 per cent over the period. This trend indicates the maturing process of the scheme.

Table 4.2 shows comparisons of the actual situation in 2014 with the projection made in the ninth valuation. The projected values reflect the scenario with the extension of coverage to age 60 in 2013.

This table highlights the following:

1. The demographic projections have slightly underestimated the actual values.
2. The actual insured salary bill is close to the estimated value, while the actual values of pensions are smaller than those projected.
3. The actual cost of other benefits is significantly higher than projected, while the administrative expenditure is almost twice that projected.

Though the actual values are fairly close to the projected ones, trends of the emerging experience in invalidity incidence may cause some pressures on costs. Figure 4.1 compares the number of new awards in 2011–14 with those of 2008–10.

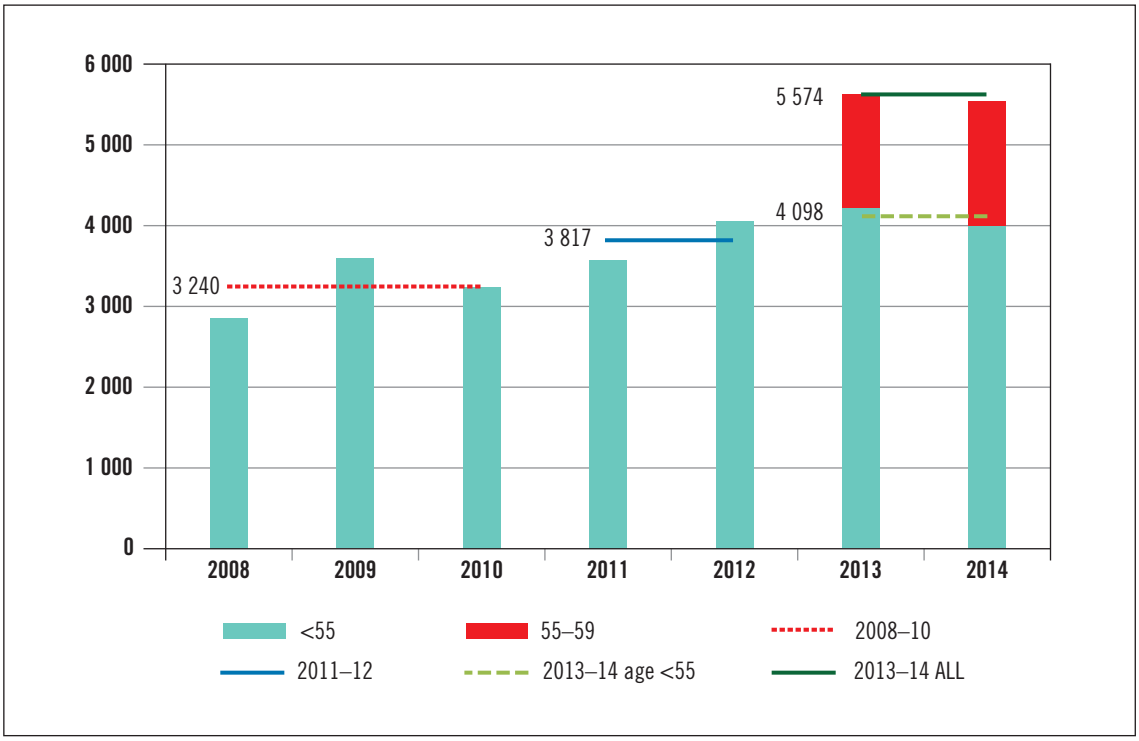
Table 4.2 Comparison of some projected values in 2014 with actual values

Item	Projected (P)	Actual (A)	Ratio A/P (%)
Demographic data			
Active population	5 801 510	6 045 278	104
Invalidity pensioners (Male & female)	47 642	48 864	103
Survivor pensioners (widows/widowers)	81 789	84 518	103
Survivor pensioners (orphans and secondary dependants)	128 421	134 617	105
Financial data (MYR millions)			
Insured salary bill	121 787	120 986	99
Invalidity pensioners	547	497	91
Survivor pensioners	949	835	88
Other benefits	193	249	129
Administrative expenditure	99	178	180
PAYG rate (%)	1.47	1.45	99

Note: The projected values are under the scenario of coverage age extended to 60 except for other benefits and administrative expenditure, which are only available under the base scenario (coverage age limited to 55).

Source of projected values: Tables 4.14, 4.16 and 4.17 of ninth actuarial valuation report.

Figure 4.1 Pension awards, 2008–14



Note: The numbers of pension awards in this figure may not fully match those in statistical reports as awards above the age limit for coverage have not been considered, to simplify the comparison with data in the previous actuarial valuation.

The average number of awards has increased from 3,240 to 5,574. Part of this increase is related to the extension of coverage up to age 60. However, it can be observed that the increase in the number of new awards below age 55 has also been significant.

4.4 DEMOGRAPHIC AND FINANCIAL PROJECTIONS

Demographic and financial projections were carried out according to the methodology and assumptions described in Appendix 2 and Appendix 3. They are presented in table 4.3.

Due to the maturing process, the ratio of invalidity pensioners to the active insured increases throughout the projection period. The ratio of widows/widowers to the active insured shows a similar pattern for the same reason. The ratio for orphans and secondary dependants shows a different pattern, first increasing to reach a peak in 2022–23 and then decreasing to a level lower than at the start of the projection period.

Table 4.4 presents the financial projections.

The PAYG rate for benefit expenditure increases materially during the projection period, from 1.39 to 2.76 per cent. The uniform contribution rate that would be necessary together with the reserve at 31 December 2014 to pay benefits in the 50 years of the projection is 2.03 per cent. At the end of this period, an indication of the required future contribution rate is provided by the PAYG rate in 2064, which is 2.76 per cent. Administrative expenditure should be added to establish the proper contribution rate.

Table 4.5 illustrates the evolution of the Invalidity fund if the contribution rate is not increased. For this illustration, the current methods of allocation of investment income and administrative expenditure are used.

Table 4.3 Demographic projections, Invalidity and Survivors' Benefits branch, 2014–64

Year	Active insured	Numbers				% per active insured			
			Dependants				Dependants		
		Invalidity	Widow (ers)	Orphans and parents	Funeral grants	Invalidity	Widow (ers)	Orphans and parents	Funeral grants
2014	6 045 278	48 864	84 520	131 475	12 333	0.81	1.40	2.17	0.20
2015	6 145 337	52 800	91 788	146 024	14 183	0.86	1.49	2.38	0.23
2016	6 259 451	56 810	99 168	151 432	14 287	0.91	1.58	2.42	0.23
2017	6 555 244	61 154	106 852	157 529	14 413	0.93	1.63	2.40	0.22
2018	6 662 693	65 470	114 498	163 396	14 974	0.98	1.72	2.45	0.22
2019	6 766 531	69 556	121 891	168 590	15 071	1.03	1.80	2.49	0.22
2020	6 865 739	73 921	129 481	173 944	15 152	1.08	1.89	2.53	0.22
2021	6 936 924	78 645	137 345	178 702	15 216	1.13	1.98	2.58	0.22
2022	7 001 615	83 441	145 198	181 704	15 209	1.19	2.07	2.60	0.22
2023	7 060 246	88 268	152 978	183 851	15 196	1.25	2.17	2.60	0.22
2024	7 116 082	93 091	160 659	185 017	15 180	1.31	2.26	2.60	0.21
2029	7 345 986	117 016	197 493	182 494	15 152	1.59	2.69	2.48	0.21
2034	7 568 040	141 867	231 270	175 567	15 239	1.87	3.06	2.32	0.20
2039	7 786 259	168 212	261 262	169 252	15 349	2.16	3.36	2.17	0.20
2044	7 846 097	195 493	286 642	159 089	15 609	2.49	3.65	2.03	0.20
2054	7 649 072	239 085	318 704	139 420	15 801	3.13	4.17	1.82	0.21
2064	7 325 502	267 410	326 013	122 697	15 612	3.65	4.45	1.67	0.21

Note: [1] Active insured: number of insured contributing at least once during the year.

Table 4.4 Financial projections, Invalidity and Survivors' Benefits branch, 2014–64

Year	Insured salary bill	Invalidity pensions	Dependants		Funeral grants	Dialysis	Other[1]	Total	Total as % of insured salary bill
			Widow (ers)	Orphans and parents					
2014	114 651	497	461	383	17	158	74	1 591	1.39
2015	125 138	560	514	428	21	174	100	1 798	1.44
2016	146 354	629	572	447	21	194	114	1 977	1.35
2017	173 065	711	638	473	23	223	129	2 197	1.27
2018	189 685	807	712	506	26	247	147	2 444	1.29
2019	207 806	915	794	544	28	274	162	2 717	1.31
2020	227 561	1 039	884	589	30	304	180	3 028	1.33
2021	246 861	1 182	985	638	33	333	199	3 371	1.37
2022	267 392	1 341	1 095	687	35	363	220	3 741	1.40

Table 4.4 continued on page 50

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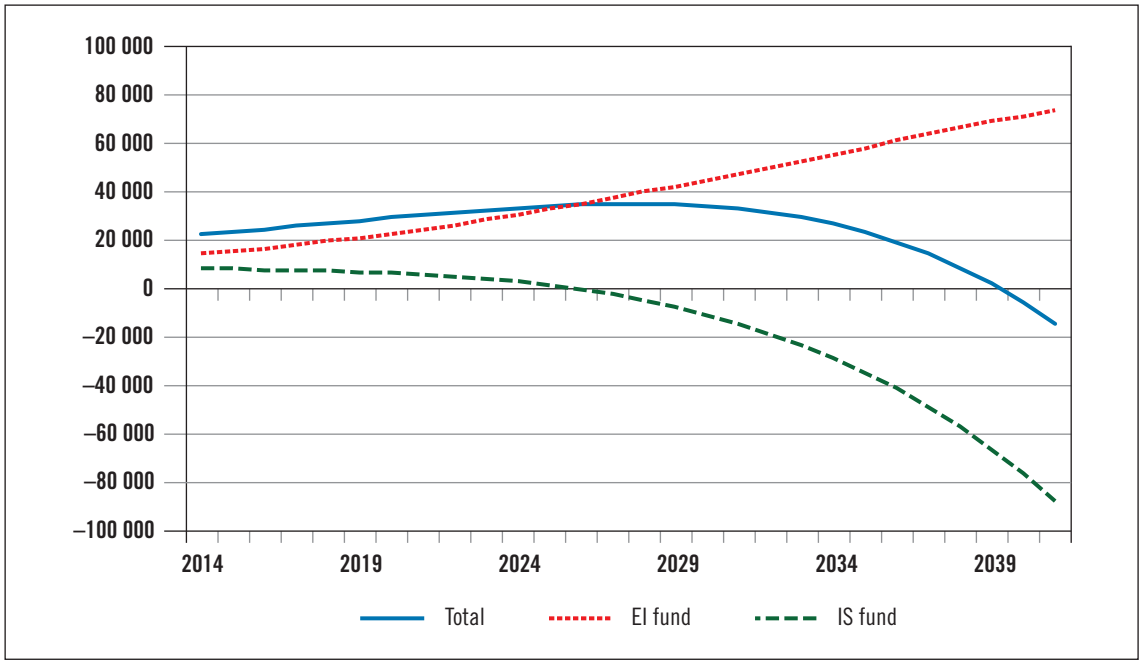
Year	Insured salary bill	Invalidity pensions	Dependants		Funeral grants	Dialysis	Other[1]	Total	Total as % of insured salary bill
			Widow (ers)	Orphans and parents					
2023	289 176	1 514	1 213	739	37	396	241	4 141	1.43
2024	312 210	1 704	1 341	792	40	431	264	4 571	1.46
2029	432 392	2 921	2 126	1 082	52	627	393	7 201	1.67
2034	574 362	4 693	3 188	1 397	68	884	557	10 786	1.88
2039	747 682	7 232	4 583	1 756	86	1222	764	15 643	2.09
2044	957 699	10 782	6 379	2 135	112	1632	1 011	22 050	2.30
2054	1 558 582	21 283	11 457	3 105	186	2749	1 615	40 395	2.59
2064	2 507 206	38 423	19 080	4 551	307	4561	2 384	69 306	2.76

Note: [1] Includes grants for invalidity and deaths, physical and vocational rehabilitation, constant attendance allowances, activities promoting safety and health, FCLB (penalties written off) and general expenditure not elsewhere classified.

Table 4.5 Illustration of projected revenue, expenditure and assets, status quo, 2014–64 (MYR millions)

Year	Income Contribution	Investment	Expenditure		Administrative	Total	Assets Total	Assets/ Expenditure
			Total	Benefits				
2014							8 195	
2015	1 251	481	1 733	1 798	232	2 030	7 898	3.9
2016	1 464	539	2 002	1 977	252	2 229	7 671	3.4
2017	1 731	562	2 293	2 196	277	2 473	7 490	3.0
2018	1 897	588	2 485	2 444	304	2 748	7 228	2.6
2019	2 078	615	2 693	2 717	331	3 048	6 872	2.3
2020	2 276	642	2 917	3 028	361	3 389	6 401	1.9
2021	2 469	668	3 136	3 371	393	3 764	5 773	1.5
2022	2 674	693	3 366	3 741	427	4 168	4 972	1.2
2023	2 892	716	3 607	4 141	462	4 603	3 976	0.9
2024	3 122	736	3 858	4 571	500	5 071	2 763	0.5
2029	4 324	777	5 101	7 201	705	7 906	-7 732	-1.0
2034	5 744	624	6 368	10 786	905	11 691	-28 848	-2.5
2039	7 477	126	7 602	15 643	1 149	16 793	-66 420	-4.0
2044	9 577	-953	8 624	22 050	1 459	23 509	-128 682	-5.5
2054	15 586	-6 185	9 401	40 395	2 400	42 794	-369 898	-8.6
2064	25 072	-19 140	5 932	69 307	4 017	73 324	-873 946	-11.9

Figure 4.2 Illustration of the evolution of funds, status quo, 2014–42 (MYR millions)



The projections indicate that the Invalidity fund would be depleted in 2026 if the contribution rate is not increased and investment income continues to be allocated to this fund according to the actual allocation formula. However, the total SOCSO fund would be depleted only in 2040 as there is a significant excess of assets over liabilities in the EI fund.

Figure 4.2 presents the evolution of the total fund under the current conditions. The total assets continue to increase until 2027. In 2028, the total expenditures exceed the total income and the fund decreases rapidly. The trends of the EI and IS funds diverge.

Financial sustainability will require action soon. The matter is discussed in Section 5.

Sensitivity to the discount rate

Though an improvement in the investment policy and operations would have a long-term favourable impact on contribution rates, it would not significantly alter the financial situation in the short term. Figure 4.3 presents the impact of an increase of 1 per cent in the real rate of return, which is the impact on the long term resulting from the changes in the investment activities that are discussed in Appendix 6.

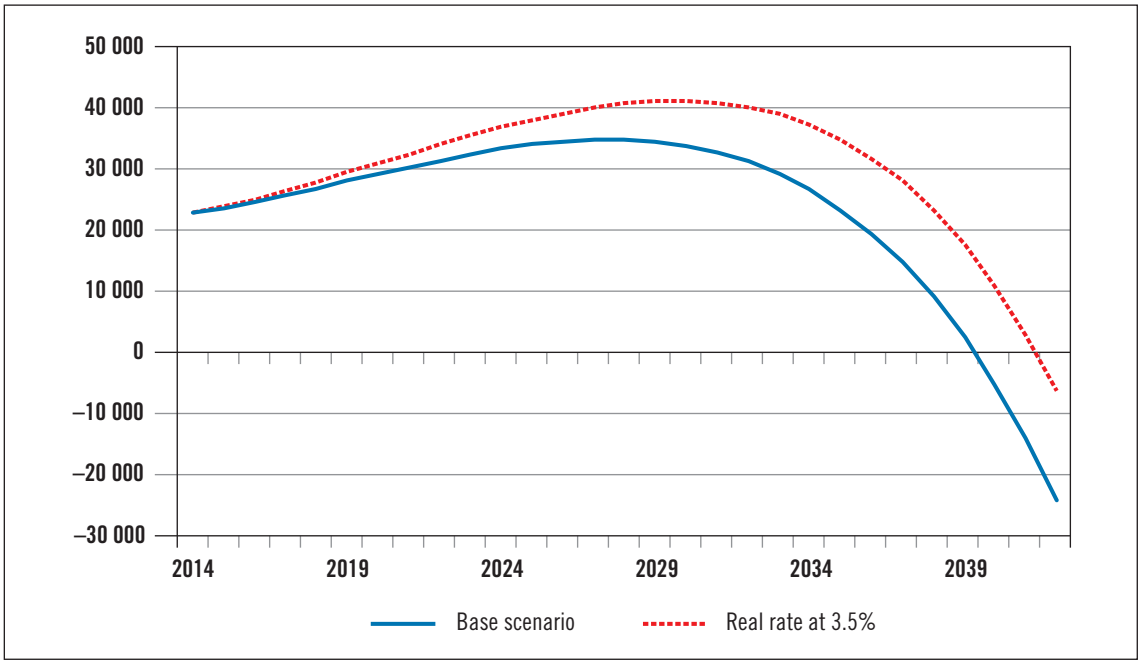
Figure 4.3 indicates that the total assets would be depleted in 2042 (2040 in the base scenario) if the rate of return is 3.5 per cent. The IS Fund would be depleted one year later (2027 instead of 2026).

4.5 CONCLUSIONS AND RECOMMENDATIONS

(1) The Invalidity and Survivors' Benefits branch is financed on a partially funded basis under the scaled premium system. This implies that the contribution rate needs to be gradually raised in the future.

(2) The PAYG cost rate increased from 1.29 per cent in 2010 to 1.45 per cent in 2014.

Figure 4.3 Sensitivity of the total Fund to the discount rate, 2014–44 (MYR millions)



(3) The increase in the number of new disability pension awards since the last actuarial valuation is significantly higher than the increase in the insured population. This is why the invalidity incidence rates in the tenth actuarial valuation are assumed higher. Termination rates of invalidity have been introduced in the tenth valuation. The cohort data on the disabled insured population should be more detailed in order to identify the status of entries (e.g. new entry or re-entry) and the causes of exits (e.g. death, recovery, administrative ...). It is recommended to implement a data analysis system in order to annually monitor the mortality of each category of pensioners (invalidity and survivors) and the recovery of disabled pensioners.

(4) The PAYG rate for benefit expenditure increases materially during the projection period, from 1.39 per cent in 2014 to 2.76 per cent in 2064. Administrative expenditure should be added to establish the proper contribution rate. The projections indicate that the current contribution rate needs to be raised. Scenarios of contribution rate increases are analysed in Section 5.

(5) The projections indicate that the Invalidity fund will be depleted in 2026 if the contribution rate is not increased. Total SOCSO assets would be depleted in 2040.

(6) Taking into account the increase in the cost of living since 2011, in order to compensate for the loss in purchasing power, pensions in payment under the Invalidity and Survivors' Benefits branch should be adjusted at the same rates proposed for the Employment Injury Benefits branch, namely:

Pensions awarded before 2011	10.4%
Pensions awarded in 2011	8.3%
Pensions awarded in 2012	6.6%
Pensions awarded in 2013	4.4%
Pensions awarded in 2014	1.2%

These adjustments have been already taken into account in the financial projections.

5

POSSIBLE MEASURES TO DEAL WITH THE FINANCIAL SITUATION

According to the financial projections, the total income will exceed the total expenditures until 2027. If no action is taken, SOCSO will have to use assets to pay benefits and administrative expenditure in 2028 and thereafter. This could only be a temporary solution since assets would be totally depleted 12 years later. This actuarial valuation confirms the trends that have been identified in previous ones. The situation is not due to the deterioration of the experience, but to the nature of the funding method for the Invalidity Benefits branch, namely the scaled premium, as described in section 4.2.

The Employment Injury Benefits branch has generated a free reserve which, according to its funding mechanism, should be considered as a cumulative surplus. Indeed, the technical reserve is meant to be sufficient to cover the commitments to pensioners who have had an accident up to the valuation date. So far, the contribution rate of 1.25 per cent has been more than sufficient to cover the costs of benefits and administrative expenditure. The projections indicate that if recent experience is anything to go by, the required contribution rate would be lower than 1.25 per cent and could possibly be set at 1.00 per cent.

Two questions can be raised. How to deal with the free reserve of the Employment Injury branch, and what contribution rate to allocate to that branch? There are several reasonable answers to these questions. One of them could be transferring the free reserve of the EI branch to the IS branch and using any decrease in the EI contribution rate to increase the IS contribution rate. These actions would not change the SOCSO projected assets, but would only modify the portrait of the financial situation of each branch until the depletion of assets takes place in 2040. These questions are nonetheless crucial, as the ways to address them can affect the schedule of contribution rates for the IS branch.

In this section, a schedule of contribution rates will be presented under two scenarios. The first one assumes that the status quo for the financing of the EI branch is maintained and the second one assumes that the free reserve of the EI branch is transferred to the IS branch and that the EI contribution rate is reduced to 1.00 per cent. The circumstances and the policy concepts that would justify each scenario will be discussed in Section 6 along with other policy issues. One of these issues is the distribution of contribution rates between employers and workers. Within the scope of this section, quantitative results under two scenarios are presented. Other intermediary scenarios could be envisaged.

A prerequisite to the modelling of contribution rate and funds is a discussion on the allocation of investment income and administrative expenditure by branch, which is the subject of the next section.

5.1 ALLOCATION OF INVESTMENT INCOME AND ADMINISTRATIVE EXPENDITURE

The purpose of presenting financial data by branch in the financial statements is to support the governance of social security schemes in helping the stakeholders to make the right decisions based on reliable financial information for each branch. To meet this objective, any allocations of income and expenditure that are common to both branches should be made according to a base that would replicate as closely as possible the results in the hypothetical situation where the two branches are administered separately by two different entities, with due adjustment for the economies of scale resulting from having one administrative body instead of two.

Investment income

The principle mentioned above means that allocation of investment income by branch should be made according to the size of each fund. This is different from current practice, which relies on the weight of contribution income by branch. This technique may have been correct and practical in the past, especially in times when the relative size of the funds was close to that of contribution income, but this is no longer the case. For the scenarios presented in this section, the allocation of investment income will be based on the size of the funds. It is recommended to adopt that technique for the financial statements.

Administrative expenditure

The administrative expenditure should be allocated by branch in proportion to the workload generated by each of them. Depending on the work organization in a given institution, the determination of the workload generated by each branch may be a more or less arduous process. It is generally possible to allocate the cost of the staff involved in claims administration by branch in a fairly accurate manner, but not so for the staff involved in the collection of contributions. A pragmatic approach is to use indicators such as the benefits expenditure and the contribution income for the allocation of administrative expenditure, with relative weights depending on the situation.

It is recommended to perform an expense analysis to gain better insight of the administrative expenditure and improve its allocation by branch. It would be useful to identify the administrative expenditure according to the basic missions of SOCSO, which are: prevention, compensation (including rehabilitation) and financing. This breakdown is the first step in the process of allocation by branch. The second step is the allocation of each mission expenditure between the two branches. For the purpose of simplicity, the scenarios presented in section 5.2 use the actual formula for the allocation of administrative expenditure by branch, which relies exclusively on contribution income. The same allocation of administrative expenditure between the two branches EI and IS (55-45) is assumed even in scenarios that analyse changes in the IS contribution rate.

In section 5.3, a different approach for the allocation of administrative expenditure will be examined.

5.2 STATUS QUO FOR THE EI BRANCH: IS CONTRIBUTION RATE INCREASES

In previous actuarial valuations, illustrations of the evolution of the scaled premium for the IS branch have been provided by using steps of 0.5 per cent. This approach is still considered valuable for illustrations as it reaches the required ultimate level in a limited number of steps. Two scenarios of different imperatives are examined in this section. Under scenario A, the rate increases are set according to the following criteria:

1. The first rate increase is scheduled in 2018 for practical reasons.
2. The next rate increases are scheduled in order to avoid decreases in reserves.

Table 5.1 Illustration of IS contribution rates, 2015–52 and beyond

Period	Scenario A (%)	Scenario B (%)
2015–2017 (3 years)	1.00	1.00
2018–2024 (7 years)	**1.50**	**2.00**
2025–2037 (13 years)	**2.00**	2.00
2038–2047 (10 years)	**2.50**	**2.50**
2048–2051 (4 years)	2.50	**2.80**
2052 and over	**3.00**	2.80
Equivalent uniform rate	2.32	2.35

Scenario B relies on a principle frequently used: the scaled premiums are set to maintain the funding ratio (ratio of assets to benefit expenditure) above a predetermined level. Under this approach, a target ratio is set and increases in the contribution rate are scheduled at specific intervals in order to prevent the funding ratio from falling below the target. For illustrative purposes, the target is set at 3 for Scenario B presented in table 5.1, which requires a material first increase of 1 per cent in 2018.

Under both scenarios, the rates should be set at 2 per cent no later than 2025 and the ultimate rate is about 3 per cent. Contribution rates are larger in Scenario B than in scenario A during the seven years after the first increase in 2018. The same situation is observed later in the projection period 2048–51. The situation reverses in 2052, but rates tend to converge. Under scenario A, the step of the last increase in 2052 would not have to be as high as 0.5 per cent in order to keep the fund sustainable. Over the full projection period, the differences between the equivalent uniform rates are tiny (2.32 per cent under scenario A and 2.35 per cent under scenario B).

Figures 5.1 and 5.2 present the PAYG rate of both scenarios along with the illustrative contribution rates and the size of the fund.

Figure 5.1 Illustration of IS rate increase, scenario A, 2015–64

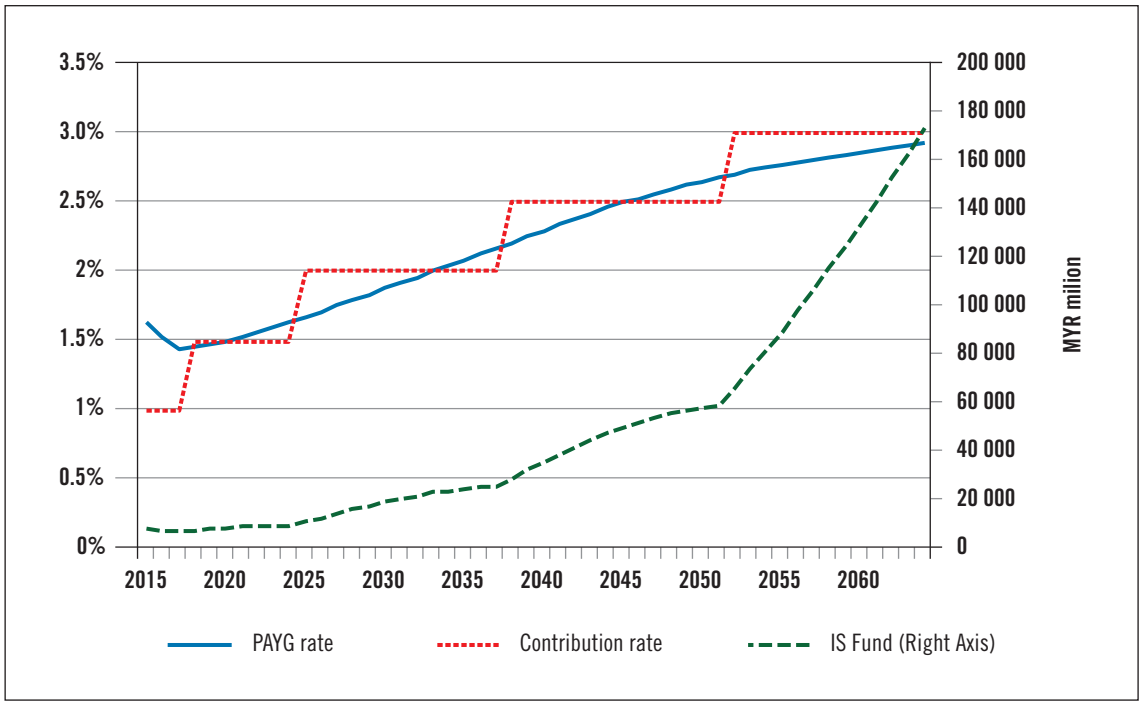


Figure 5.2 Illustration of IS rate increase, scenario B, 2015–64

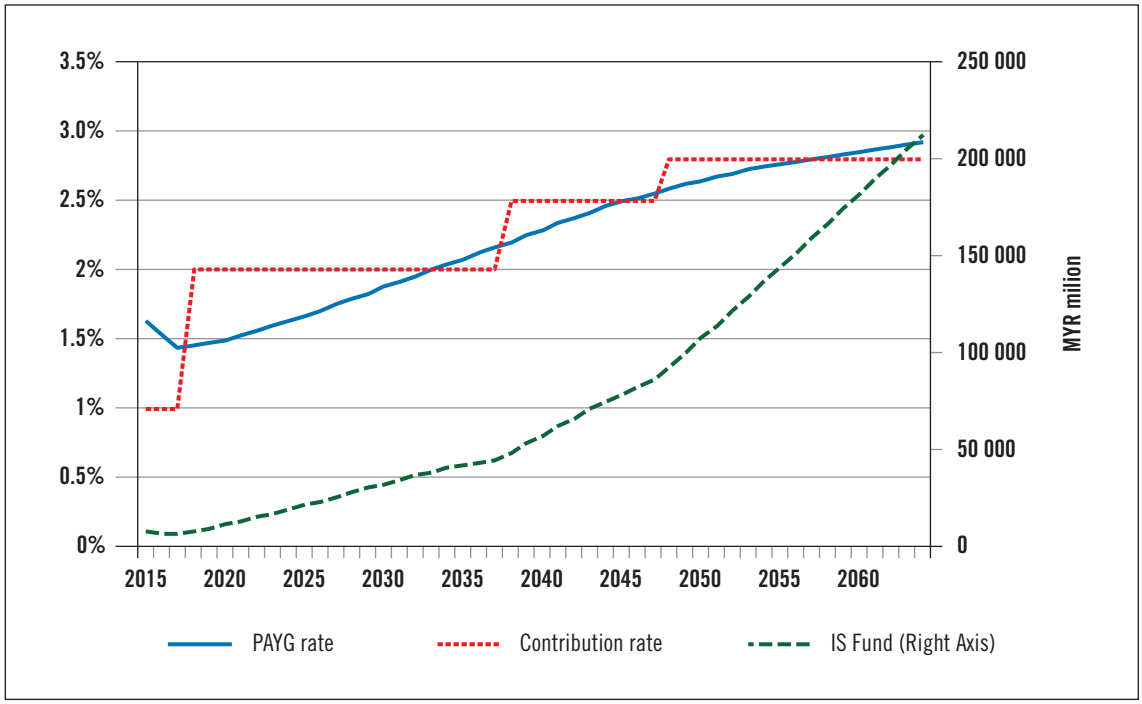
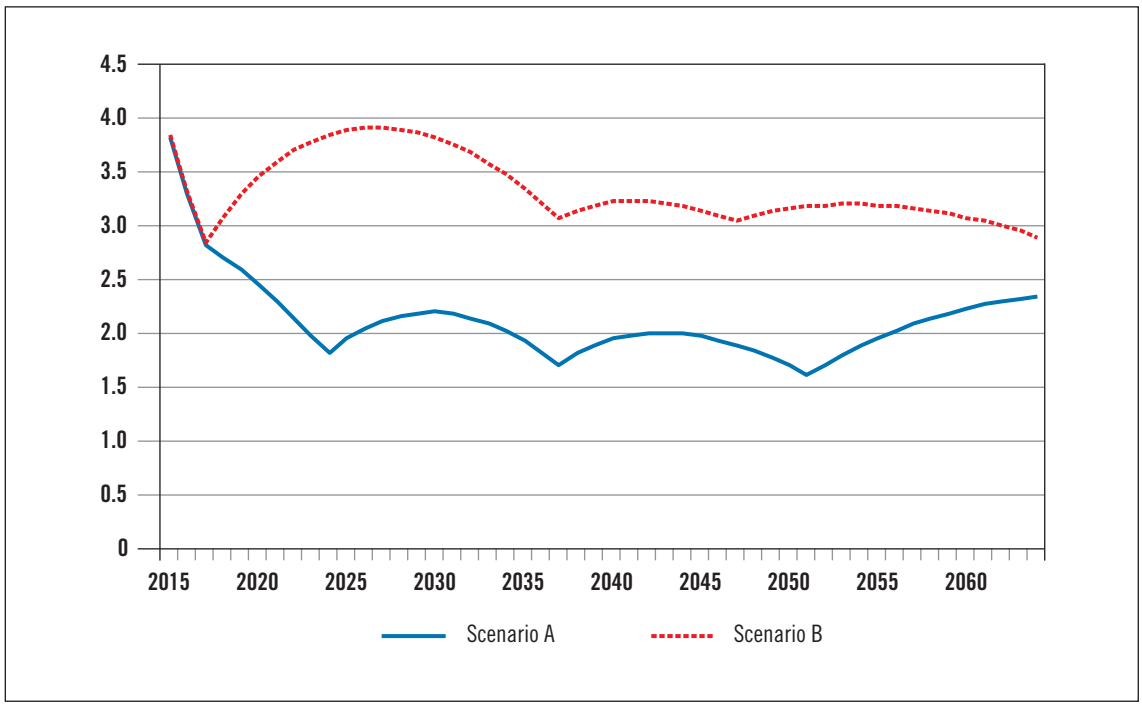


Figure 5.3 Funding ratio, IS assets/benefit expenditure, 2015–64



Scenario A can be used as a guide to set the schedule of rate increases.

The difference between the scenarios lies in the timing and level of contribution rates. Figure 5.3 shows the ratio of assets to liabilities for both scenarios.

Under scenario A, the funding ratio is increasing at the end of the projection period since the contribution rate is above the PAYG rate of 2.92 per cent.

5.3 TRANSFER OF FREE RESERVE AND CONTRIBUTION RATE FROM EI TO IS

This section examines the impact of changes in certain financial provisions. They are assumed to take place on 1 January 2018 as follows:

(1) The free reserve of the EI branch is transferred to the IS branch.

(2) The contribution rate of the EI branch is reduced to 1 per cent while that of the IS branch is increased to 1.25 per cent on 1 January 2018. Thereafter, the EI contribution rate is constant at 1 per cent and the IS rate increases in such a manner that the IS fund never decreases (as in scenario A).

(3) Investment income is allocated by branch according to the size of the funds.

(4) The allocation of administrative expenditure between branches is based on international experience: 80 per cent of administrative expenditure is allocated by branch according to benefits and the rest (20 per cent) is allocated in equal shares between the two branches. (This allocation is almost equivalent to an allocation according to insurable earnings.)

(5) The technical reserve of the EI is calculated retrospectively at each year-end based on the actuarial assumptions applicable at 31 December 2014.

Table 5.2 shows the impact of a hypothetical restatement of reserves at 1 January 2018.

Table 5.3 shows the contribution rates corresponding to this scenario.

Figure 5.4 presents the evolution of funds under this scenario.

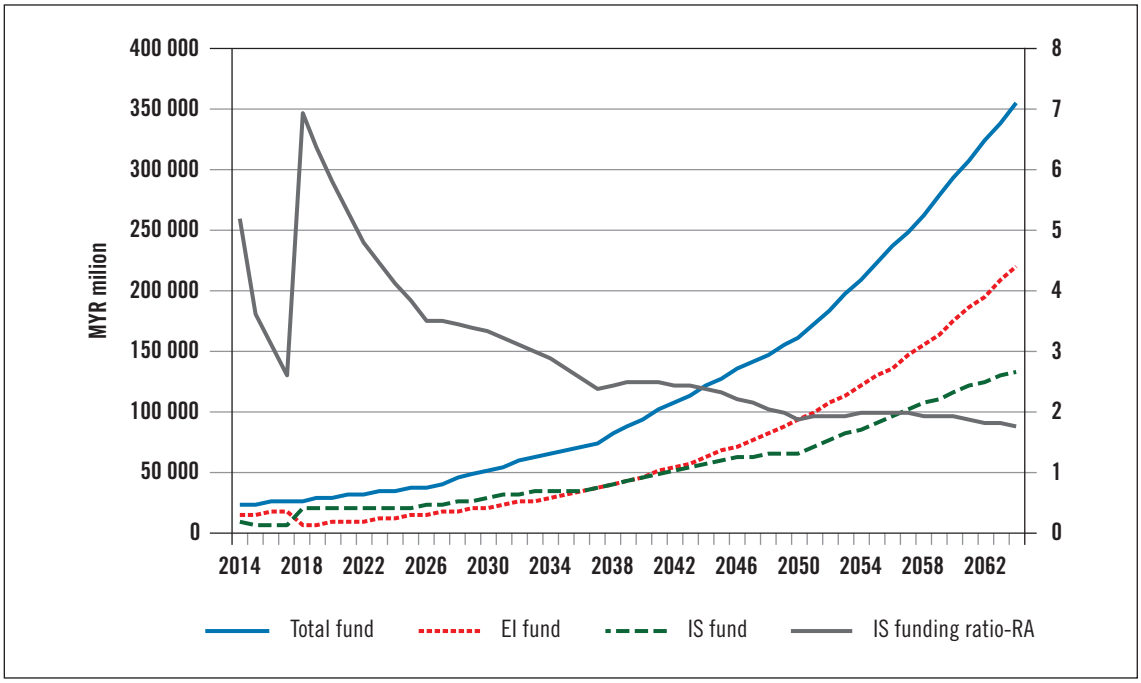
Table 5.2 Transfer of free reserve from EI to IS (MYR millions)

Fund	At 31 December 2017	Restatement at 1 January 2018
Employment injury	18 983	6 375
Technical reserve	5 814	5 814
Contingency reserve	562	562
Free reserve	12 608	0
Invalidity	6 712	19 320
Free reserve	6 712	19 320
Total	25 695	25 695

Table 5.3 Transfer from EI to IS, illustration of contribution rates, 2015–64 (percentages)

Period	Employment injury	Invalidity	Total
2015–17	1.25	1.00	2.25
2018–22	1.00	1.25	2.25
2023–26	1.00	1.50	2.50
2027–37	1.00	2.00	3.00
2038–50	1.00	2.50	3.50
2051–64	1.00	2.90	3.90
Equivalent rate	1.01	2.26	3.27

Figure 5.4 Transfer from EI to IS, evolution of funds, 2014–64



Note: RA: Ratio assets

Highlights of the figure are the following:

- The total assets increase steadily, which indicates that the financial situation of SOCSO is sound.
- After the transfer in 2018, the ratio of assets to expenditure of the IS branch declines gradually and stabilizes below 2 at the end of the projection period.
- On 1 January 2018, the EI fund represents 33 per cent of the IS fund; this percentage steadily increases to reach 166 per cent in 2064. This is because the contribution rate of 1 per cent is higher than the cost, and a material free reserve develops over time. This situation is however unlikely to take place, as the need for restatement of reserves would become obvious at a certain time.

Overall, the transfer of funds from EI to IS has a limited impact on the future contribution rate of the IS fund and only delays the first increase steps in the contribution rate by a few years. Figure 5.5 compares the contribution rates under the various scenarios.

Use of terminal funding in the IS branch

As the IS branch has reached a certain stage of maturity, it may be worth analysing whether the terminal funding method used for the EI could also be used for the IS branch (see table 5.4). An advantage would be that a technical reserve representing the present value of benefits in payment could be posted in the financial statements and the stakeholders would understand the link between the accumulation of assets and the liabilities.

The use of the terminal funding system could be contemplated in the funding policy of the IS branch as well as in the presentation in the financial statements. At the stage of maturity the branch has reached, it can be expected that, other things being equal, the actuarial present value of awards of invalidity pensions and survivors' pensions generated by active contributors is stable. The cost of survivors' pensions from deceased invalidity pensioners could be included in the factors used for the determination of present values of awards of invalidity pensions; this is technically named a reversion provision. For funding purposes, the technical reserve can serve as a target for the asset accumulation. The technical

Figure 5.5 IS contribution rates under various scenarios, 2014–64

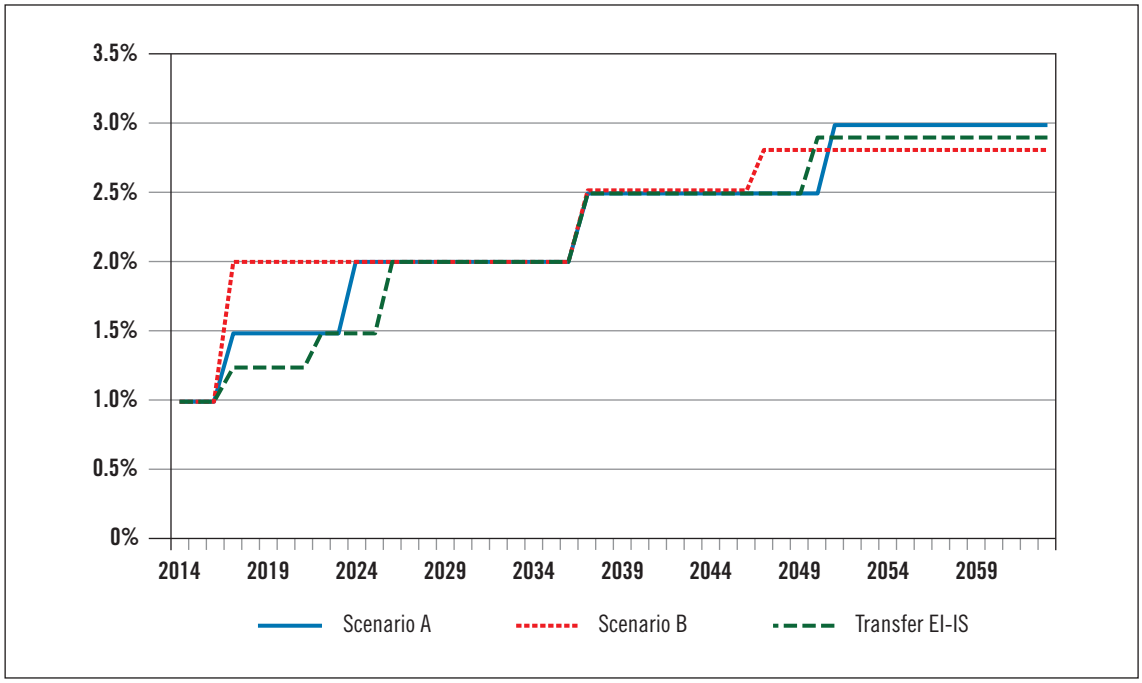
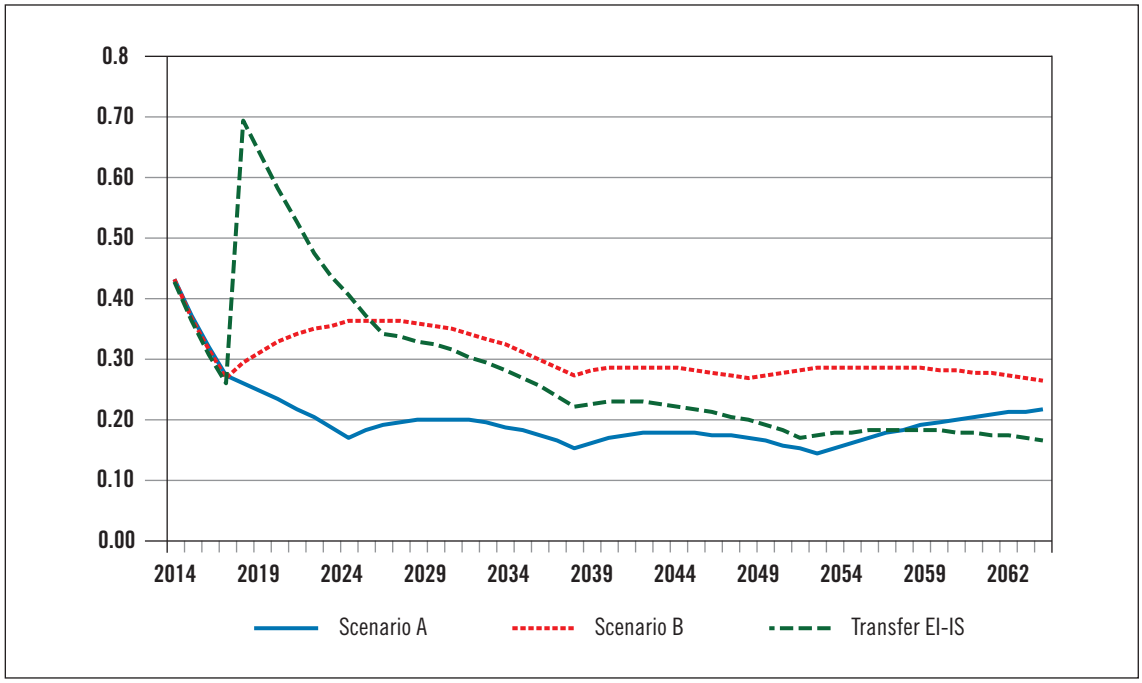


Table 5.4 Financial projections of invalidity benefits, terminal funding, 2015–64 (MYR millions)

Year	Insured salary bill	Invalidity pension awards	Invalidity survivors' grants	Dependants from actives		Funeral grants	Dialysis	Other[1]	Total	Total as % of insured salary bill
				Widow (ers)	Orphans and parents					
2015	125 138	1 285	1	997	372	21	174	100	2 949	2.36
2016	146 354	1 455	1	1 093	392	21	194	113	3 269	2.23
2017	173 065	1 748	0	1 270	441	23	223	128	3 833	2.21
2018	189 685	1 962	2	1 388	465	26	247	145	4 235	2.23
2019	207 806	2 199	2	1 517	500	28	274	161	4 681	2.25
2020	227 561	2 582	1	1 731	566	30	304	179	5 394	2.37
2021	246 861	2 874	1	1 878	610	33	333	198	5 927	2.40
2022	267 392	3 165	1	2 010	650	35	363	219	6 442	2.41
2023	289 176	3 471	1	2 143	689	37	396	240	6 978	2.41
2024	312 210	3 783	1	2 277	730	40	431	263	7 524	2.41
2029	432 392	5 631	1	3 023	941	52	627	392	10 668	2.47
2034	574 362	8 241	1	3 887	1 159	68	884	555	14 796	2.58
2039	747 682	11 795	1	4 851	1 376	86	1 222	763	20 094	2.69
2044	957 699	15 767	1	5 973	1 651	112	1 632	1 009	26 146	2.73
2054	1 558 582	26 264	2	8 885	2 430	186	2 749	1 613	42 129	2.70
2064	2 507 206	43 345	3	13 114	3 532	307	4 561	2 383	67 244	2.68

Note: [1] The cost of Invalidity and dependants' pensions is the present value of pensions awarded during the year. For all other benefits, the cost is the payments made during the year.

Figure 5.6 IS ratio of assets to technical reserve, 2014–64



reserve would be calculated every year and equal to the present value of all invalidity and survivors' pensions in payment at the end of the year. The technical reserve on 31 December 2014 is estimated at MYR 19,619 millions on the basis on the actuarial assumptions of this valuation.

The ratio of benefits to insured salaries increases moderately over the projection period except for the impact of the increase in maximum insurable earnings (MIE) in 2016. It is at a lowest level of 2.21 per cent in 2017 and tends to stabilize around 2.7 per cent in 25 years. Figure 5.6 shows the projected ratio of assets to the technical reserve under the three scenarios of contribution rates discussed so far.

The ratios decrease until the first increase in the contribution rate or fund transfer occurs. Under the fund transfer scenario, the ratio increases significantly to 67 per cent in the year of the transfer, but decreases fairly rapidly in the next decade. The ratios of all three scenarios tend to converge in the range of 15 to 30 per cent. The ratio of assets to technical reserve can be a criterion for the determination of contribution rates. A target of 100 per cent for the ratio would not be practical as the increase in contribution rates would be too sharp. For example, a contribution rate of 2.90 per cent starting in 2023 would be needed for the ratio to reach 80 per cent in 2064. Modest targets lower than 50 per cent would be more realistic. The advantage of this approach is to link the fund to the liabilities of pensions in payment. The relationship between the commitments of the fund and the assets would be more transparent to stakeholders. This would contribute to avoiding or at least reducing the pressures to increase benefits because of misunderstanding of the accrued liabilities of the scheme and the funds available.

6

OTHER ISSUES

SOCSO is interested in assessing the financial impact of recent changes in parametres and benefits, and addressing certain contemplated changes. This section deals with those issues and includes recommendations on financial matters. It is structured as follows:

(1) Financial impact of recent and contemplated changes

(2) Discussion of specific programmes

(3) Extension of the EI scheme to foreign workers

(4) 24-hour coverage of accidents under the EI scheme

(5) Measures to deal with the financial situation

(6) Development of in-house actuarial and statistical capabilities

6.1 FINANCIAL IMPACT OF RECENT CHANGES

The financial impact on the projections has been determined separately for each of the following changes:

(1) Increase of the minimum pension in the IS scheme from MYR 250 to 475 (since 1 January 2012).

(2) Increase of the minimum daily amount for disablement and dependants' pensions from MYR 10 to 30 (since 1 January 2014).

(3) Constant attendance allowance (CAA) at MYR 500 instead of 40 per cent of disablement and invalidity pension (since 1 January 2013).

(4) Increase of the qualifying age from 55 to 60 for the IS scheme (since 1 January 2013).

(5) Increase of the maximum insurable earnings (MEI) from MYR 3,000 to 4,000 on 1 June 2016 and coverage of all eligible employees regardless of their monthly wages.

Table 6.1 shows what the present value of insurable earnings, the present value of benefits and the general average premium (GAP) would have been if each of these parametres or provisions had remained unchanged over the 50-year projection period. The projected values under the base scenario are also presented for comparison.

The change in the **minimum benefit** and for the **constant attendance allowance** have a small impact on the cost of the schemes. It is important to keep in mind that for the purpose of the projections, it is assumed that minimum pensions and the constant attendance allowances would increase annually according to the variation in wages.

Table 6.1 Financial impact of certain changes

Description	Present value at 31.12.2014 (MYR millions)		General average premium (GAP) B/A (%)
	Insurable earnings A	Benefits B	
Employment injury			
Base scenario	*10 930 543*	*83 860*	*0.77*
Minimum daily benefit at MYR 10	10 930 543	81 832	0.75
CAA at 40% of disablement pension	10 930 543	83 842	0.77
MIE at MYR 3,000	9 755 148	76 233	0.78
Invalidity			
Base scenario	*10 362 981*	*218 145*	*2.11*
Minimum pension at MYR 275	10 362 981	215 894	2.08
CAA at 40% of disablement pension	10 362 981	215 358	2.08
End of coverage at age 55	9 690 521	166 007	1.71
MIE at MYR 3,000	9 255 747	197 785	2.14

The financial impact of the **extension of coverage to age 60** in the IS scheme is material. The GAP increases by 40 basis points, or 23 per cent, when compared to the hypothetical rate in the absence of extension. The details of the demographic and financial projections are presented in Appendix 5. The impact of the extension of coverage on the PAYG cost rate as projected in this actuarial valuation is more material than in the ninth actuarial valuation (see tables 4.13 and 4.17 of the Ninth Actuarial Valuation Report). The invalidity incidence rates for the age group 55–59 used in the base scenario of this valuation are based on the experience of the first two years of extension of coverage and do not show any abnormal pattern when compared to international experience. Thus, it seems improbable that the emerging experience is related to unfavourable statistical fluctuations. It is recommended to closely monitor the award of invalidity pensions in order to contain costs.

In most social security systems, the invalidity pension becomes a retirement pension at normal retirement age. Pension formulas are designed in such a manner that insured persons cannot cumulate an invalidity pension with a retirement pension. It seems that this is not the situation in Malaysia, as employees awarded an invalidity pension by SOCSO can also withdraw their accumulated fund from the Employees Provident Fund. This may be associated with overcompensation in specific cases, and would not be an efficient use of social security funds.

The maximum **insurable earnings** (MIE) increase from MYR 3,000 to 4,000 on 1 June 2016, along with the phasing of certain clauses of optional coverage to high wage earners. It is estimated that the proportion of insured persons with full wages covered would increase from 0.75 to 0.83.

For both the EI and IS schemes, the MIE increase to MYR 4,000 has only limited impact on the GAP. The GAP for the EI scheme is 1 basis point lower after the increase in the MIE, while for the IS scheme it is 3 basis points lower.

It should be noted that in all projection scenarios, the MIE is assumed to increase annually according to the general wage increase, even though in practice it is adjusted only sporadically. It is recommended to introduce an yearly automatic adjustment of the MIE based on a reliable indicator of the wage increase. However, such a yearly adjustment may not be practical administratively as long as the system of salary bands is in use for the determination of the insurable salary. The contemplated

update of the operational systems should plan for moving toward registering salary amounts directly. Meanwhile, the adjustment of the MIE can be less frequent than yearly but at more regular intervals.

The development of a reliable wage index normally requires the involvement of a national statistics organization. Regarding the setting of the MIE level in relation to the national wage, the ILO Social Security (Minimum Standards) Convention, 1952 (No. 102) recommends that the earnings' ceiling should cover: (i) the average earnings of a skilled manual male employee; (ii) the earnings of at least 75 per cent of all insured persons; and (iii) at least 125 per cent of the average earnings of insured persons.

No-claim bonus to insured at age 60

SOCSO offers an insurance coverage to workers in case of disablement, invalidity or death during their active working life. Unlike a retirement pension programme, the majority of insured persons will not receive benefits. In fact, the efficiency of prevention programmes will contribute to reducing the number of beneficiaries and the cost.

Some workers who have contributed during their whole career but have not suffered any of the insured contingencies have tended to focus on the unfairness of no benefit received rather than the good fortune of no injury or sickness incurred. This is a consequence of misunderstanding of insurance principles; education is the real solution to address this misunderstanding. However, when invalidity and death social protection are provided separately from the retirement programme, education in the matter is a challenge.

In order to alleviate complaints, SOCSO has asked for the examination of a proposed payment of a no-claim bonus to insured persons who have reached the age of 60 years and have not claimed any benefit to be examined.

ILO does not recommend the implementation of any benefit of this kind. Nevertheless, the financial impact of a benefit usually offered in retirement plans to participants who do not meet the eligibility conditions for a pension have been assessed. This particular benefit would be included into the IS scheme and would consist in the reimbursement of workers' contributions with interest to those reaching age 60 and not having claimed any benefits from SOCSO.

Because of limitations in the database of insured persons not having recently contributed, the projections rely partly on theoretical considerations and are therefore subject to uncertainty. The take-up rate of such benefits may not be 100 per cent, as those who have contributed only during short periods, or have stopped contributing for many years before reaching age 60, may not claim. As the cost estimate assumes a take-up rate at 100 per cent, this may be considered as the upper bound of a range of estimates. SOCSO may consider a certain minimum of years of contributions to provide such benefit. Table 6.2 provides the estimated PAYG rate for this benefit under two eligibility conditions.

Considering that the corresponding long-term PAYG benefit rate for the IS scheme is about 2.70 per cent, the relative cost increases are 13 and 11 per cent respectively for the scenarios with eligibility after 1 year and 15 years of contribution.

Table 6.2 Long-term PAYG rate for no-claim bonus at age 60

	Eligibility condition	
	1 year of contribution	15 years of contribution
Pay-as-you-go rate	0.0035	0.0030

ILO does not recommend implementing such a benefit. An education campaign, possibly in conjunction with the Employees Provident Fund, should be undertaken to address the matter. In addition, other ways more in line with the scheme's mission and long-term perspective should be explored in addressing workers' complaints. Assessing workers' need for protection after age 59 while in active employment and after retirement should provide ideas for measures to consider. The extension of death benefits after age 59 is an example.

6.2 DISCUSSION OF SPECIFIC PROGRAMMES

In addition to cash benefits, SOCSO provides services to people suffering disablement or invalidity and is interested in identifying the financial impact of these services on the funds. Particular concerns include the replacement rate in case of temporary and permanent disablement, and the schedule of permanent disablement percentages. This section will address the following topics:

- benefits for temporary and permanent disablement;
- Return to Work Programme;
- establishment of the Rehabilitation Centre;
- dialysis treatment; and
- Health Screening Programme.

Certain topics are interrelated and may influence each other.

Temporary and permanent disablement benefits

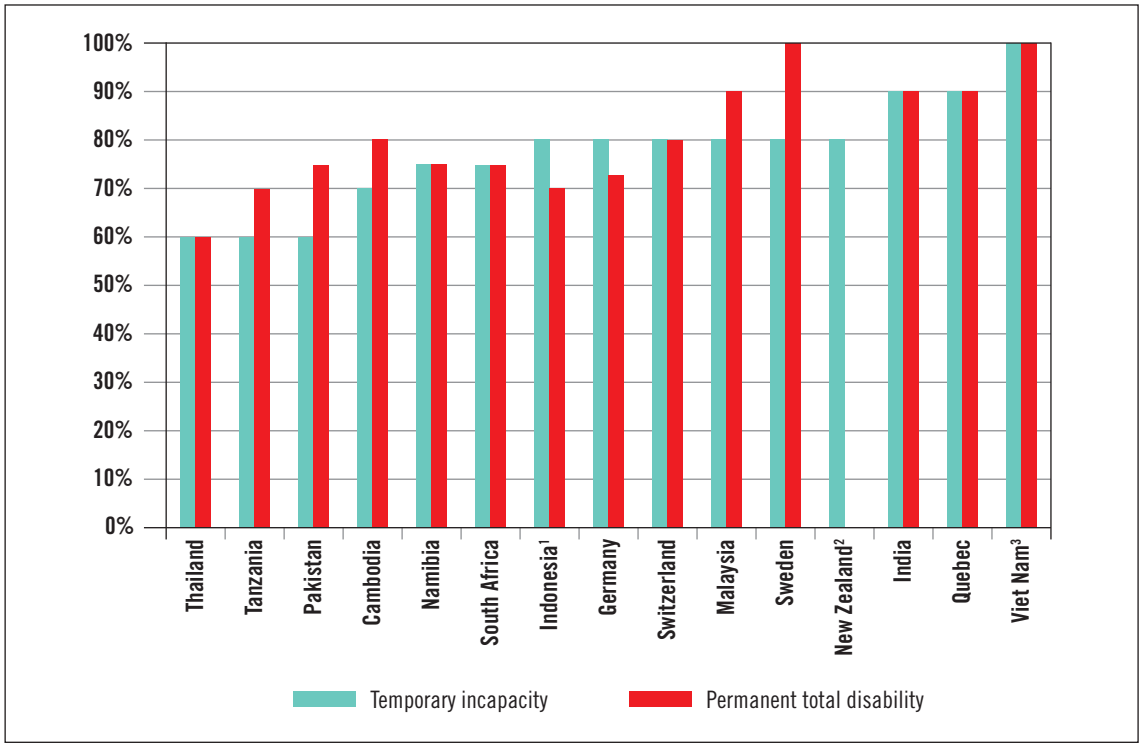
SOCSO has asked for the temporary and permanent disability replacement rates, at respectively 80 and 90 per cent of reference wages, to be reviewed considering other factors in the disability assessment such as percentages of loss of earning capacity in the Second Schedule of the Employees' Social Security Act of 1969. The purpose of this review is to assess whether the current system provides adequate and fair compensation to injured workers.

Certain comments by SOCSO staff revealed concerns about overcompensation; there is an impression that lump sums paid in certain cases of partial permanent disablement are high. The replacement rate and disablement assessment will be examined to assess the adequacy of benefits related to loss of earning capacity.

During the discussions, the view was also expressed that it is unfair to pay smaller amounts to older workers than to young workers for the same percentage of disablement, as the latter have contributed for shorter periods at the time of receiving compensation. This concern seems related to a misunderstanding of the objectives of an employment injury scheme compared to an invalidity scheme. The latter is often available as ancillary benefits within a retirement pension scheme. As the social security system in Malaysia provides invalidity benefits through a scheme separated from the retirement pension scheme, the impression of discrimination against older workers for the determination of invalidity benefits may be raised by stakeholders more easily than it would be in an agency administering a retirement pension system.

It should be remembered that the purpose of an employment injury scheme is to provide comprehensive compensation, including rehabilitation, to injured workers in exchange for relinquishing the right to sue the employer. Prevention is also an integral part of the package. Protection of injured workers must be comprehensive and available on day one at the worksite. As to universal pension schemes, their purpose is to provide basic protection in case of retirement, invalidity or death of breadwinners. It is considered acceptable that those schemes require a certain threshold in the length of contribution

Figure 6.1 Illustration of replacement rates for disablement benefits



[1] In Indonesia, average percentage for one year of benefits.
[2] In New Zealand, permanent total disability benefits are lump sums.
[3] In Viet Nam, the replacement rate for permanent disability applies to the minimum wage.

period for eligibility to benefits, and link the benefit amount to the length of contribution period. It is expected that the basic protection is complemented by collective or individual private insurance.

The current replacement rates of income for temporary (80 per cent) and permanent (90 per cent) disablement in the EI scheme are well above those recommended in ILO Convention and Recommendation No. 121, which are respectively 60 and 66.7 per cent of reference wages. International comparisons indicate that the replacement rates in Malaysia are among the most generous in the world. Figure 6.1 presents replacement rates in selected countries in different parts of the world for 100 per cent disablement. The figure shows only a partial picture of compensation, as provisions regarding the assessment of loss of earning and the duration of payments vary across countries.

A high replacement percentage for permanent disability does not automatically generate overcompensation. In practice, the risk of overcompensation for injured workers with 100 per cent degree of disablement is non-existent. Very severe cases generally represent a small proportion of permanently disabled workers and there is hardly any work income in such cases. Assessing adequate compensation for partially disabled workers is a sophisticated exercise and relies on a mix of technical tools and judgement. The possibility of over- or undercompensation is a reality because of the limitations of the tools used to assess the loss of earning capacity.

Medical scales are the most common technical tools used to assess the degree of disablement. They are often presented in the form of tables that indicate the degree of loss of physical functions corresponding to the loss of different body parts or faculties. It is generally recognized that such tables are not suitable to assess the real loss of earning capacity. They are designed to assess the impairment of persons in the conduct of their daily activities. They cannot consider characteristics of individuals such as age, gender, education, experience, or potential for rehabilitation that affect the loss of earning capacity of injured workers. Attempts to adjust the medical tables to better assess the loss of earnings

are destined to fail, as the result cannot be fully satisfactory. Given the law of large numbers, medical scales may on average provide fair compensation, but for individual cases, the mismatch between the loss of earning capacity and the compensation may be significant. In order to improve the adequacy of compensation, certain countries have moved to another approach: they pay separate compensation for occupational damage and physiological damage.

The compensation of **occupational damage** is an economic concept. The actual loss of earning or the loss of earning capacity is assessed on a case-by-case basis, comparing the wage of the worker at the time of injury with the actual wage after rehabilitation or the wage that can be earned taking into account the residual abilities of the worker after completion of the rehabilitation programme. In the latter case, a suitable employment is determined and the wage related to such employment becomes the potential earnings of the injured worker. Such suitable employment must be reasonably available in the market. The initial periodical payment is expressed as an absolute amount equal to the difference between the wage at time of accident and the potential earnings, or a percentage of one or both of them. The benefit amount may be revised periodically and vary according to the evolution of the situation of the injured worker.

As to **physiological damage**, this is compensated by using medical tables. The percentage obtained is applied to a predetermined amount, which is not earnings-related and corresponds to a compensation of 100 per cent disablement. This reference amount may vary by age to take into account the life expectancy of injured workers. It is set at a level which is acceptable by stakeholders and generally represents a multiple of average wages of all insured persons. For example, in Switzerland the reference amount is set at the national average wage, while in Quebec it varies from age 18 to age 65, from two to one times the national average insurable earnings. Other countries applying this approach include Denmark, Finland, Luxembourg and Sweden. In order to illustrate the magnitude of the difference in the compensation level for non-pecuniary damage, Figure 6.2 presents the ratio of current SOCSO benefits implicitly paid in case of no loss of earning capacity to what would be paid according to the Swiss scheme.

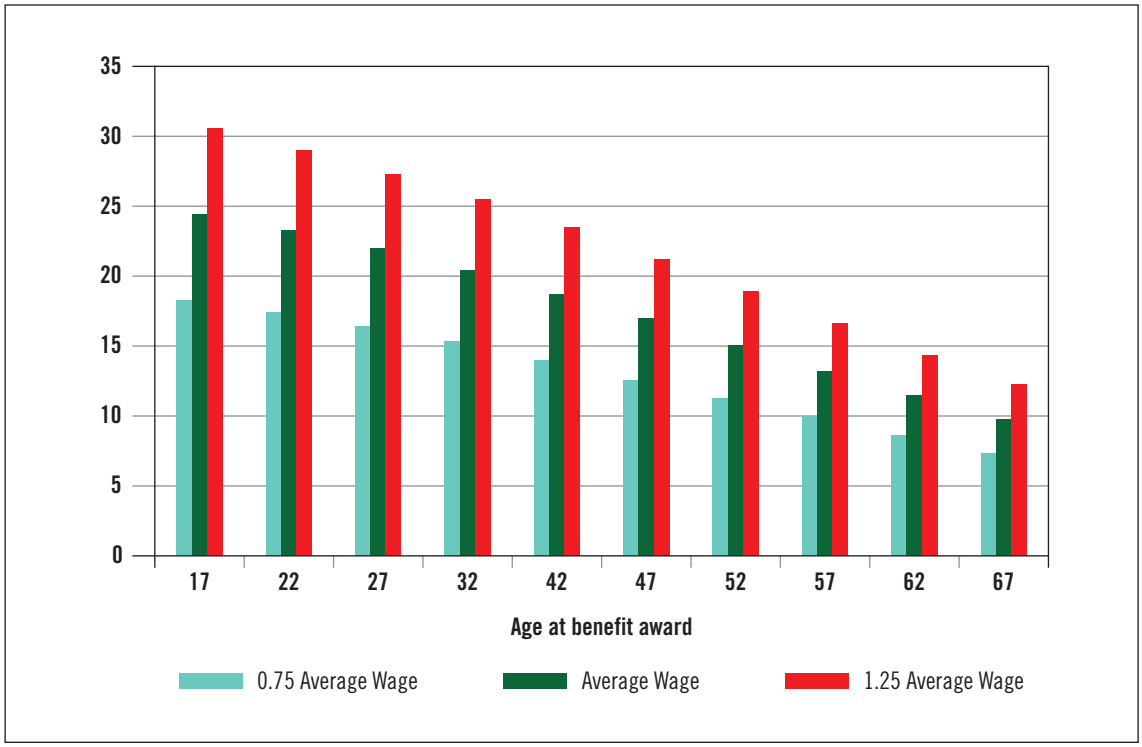
Figure 6.2 shows ratios varying from 8 to 31 for selected combinations of wage and age. This does not mean that a change to the separate compensation system would procure SOCSO cost savings proportional to those ratios. A certain proportion of injured workers would receive higher pensions than under the current system, which would offset partially or totally the decrease in the lump sums. There would be a shift in costs between lump sums and pensions. An investigation would be necessary to assess the net financial impact.

In theory, separate compensation systems may provide for more adequate compensation. Overcompensation is systematically avoided for light injuries when the worker can resume work without loss of earnings, and undercompensation should also be avoided when a modest physical impairment generates an important loss of earning capacity. However, separate compensation systems are difficult to manage and require a solid knowledge of the job market on the part of their managers. Periodical benefits may be low for workers left with residual capacities to return to work, which may make them feel undercompensated if they do not succeed in remaining in the job market. This creates dissatisfaction and litigation.

Moving from a system relying exclusively on a table of percentages to assess disablement to a separate compensation approach system is a significant step and requires careful analysis of the situation. It is recommended that SOCSO develop an understanding of this approach with a view to be ready to propose a change to stakeholders should the current approach prove to be inadequate. Inadequacy could be demonstrated through an investigation of the job situation of injured workers a few years after their completion of the rehabilitation programme and an assessment of their permanent disablement percentage.

The Second Schedule of the Malaysia Employees' Social Security Act, 1969 links physical damage to percentage of loss of earning capacity and thus plays a crucial role in the determination of disablement

Figure 6.2 Comparison of theoretical non-pecuniary damage, ratio SOCSO/Swiss scheme



benefits. SOCSO has asked for adequacy of the schedule to be analysed in this actuarial valuation. The schedules of British Columbia (Canada),[2] South Africa[3] and Singapore[4] have been used for comparison of the level of benefits awarded for different injuries.

Table 6.3 presents the injuries of the Second Schedule that are deemed to result in permanent total disablement, together with the percentage of loss of earning capacity deemed under the other three schemes. The schedules for Malaysia and Singapore are alike except for deafness, which is considered a lower level of loss in Singapore. The Malaysian schedule more generous than the schedules of British Columbia (Canada) and South Africa for about half the list of injuries.

Table 6.4 presents the injuries of the Second Schedule that are deemed to result in partial disablement with their percentage of loss of earning capacity under the four schemes. The following observations can be drawn from this comparison:

- Concerning cases of amputation of upper limbs, the Malaysian schedule is the most generous – more generous in all cases than the schedules of British Columbia and South Africa. In a few cases, the schedule of Singapore can be slightly superior.
- Concerning cases of amputation of lower limbs, once again the Malaysian schedule is the most generous, roughly equivalent to the schedule of Singapore (sometimes more and sometimes less generous). It is more generous than the schedule of British Columbia in all cases and more generous or equivalent in a few cases to the schedule of South Africa.

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[2] Workers' Compensation Board of British Columbia: *Permanent disability evaluation schedule*, Appendix 4, 39.10.

[3] Republic of South Africa, Department of Labour: Act No. 130 of 1993: Compensation for Occupational Injuries and Diseases Act as amended by Compensation for Occupational Injuries and Diseases Amendment Act, No. 61 of 1997, Schedule 2, p. 47. Available at: http://www.chr.up.ac.za/undp/domestic/docs/legislation_28.pdf.

[4] Ministry of Manpower, Singapore: *A guide to the assessment of traumatic injuries and occupational diseases for work injury compensation*, Appendix A.

Table 6.3 Schedule of injuries deemed to result in permanent total disablement, % loss of earning capacity, comparison of SOCSO with selected other schemes

Injuries	Malaysia	British Columbia	South Africa	Singapore
(1) Loss of both hands or amputation at higher sites	100	100	100	100
(2) Loss of a hand and a foot	100	75	85–95	100
(3) Double amputation through leg or thigh, or		100	90–100	
amputation through leg or thigh on one side and loss of other foot	100	60–75	80–100	100
(4) Loss of sight to such an extent as to render the claimant unable to perform any work for which eyesight is essential	100	100 (total blindness)	100	100
(5) Very severe facial disfigurement	100			
(6) Absolute deafness	100	15	50	60

Table 6.4 Schedule of injuries deemed to result in permanent partial disablement, % loss of earning capacity, comparison of SOCSO with selected other schemes

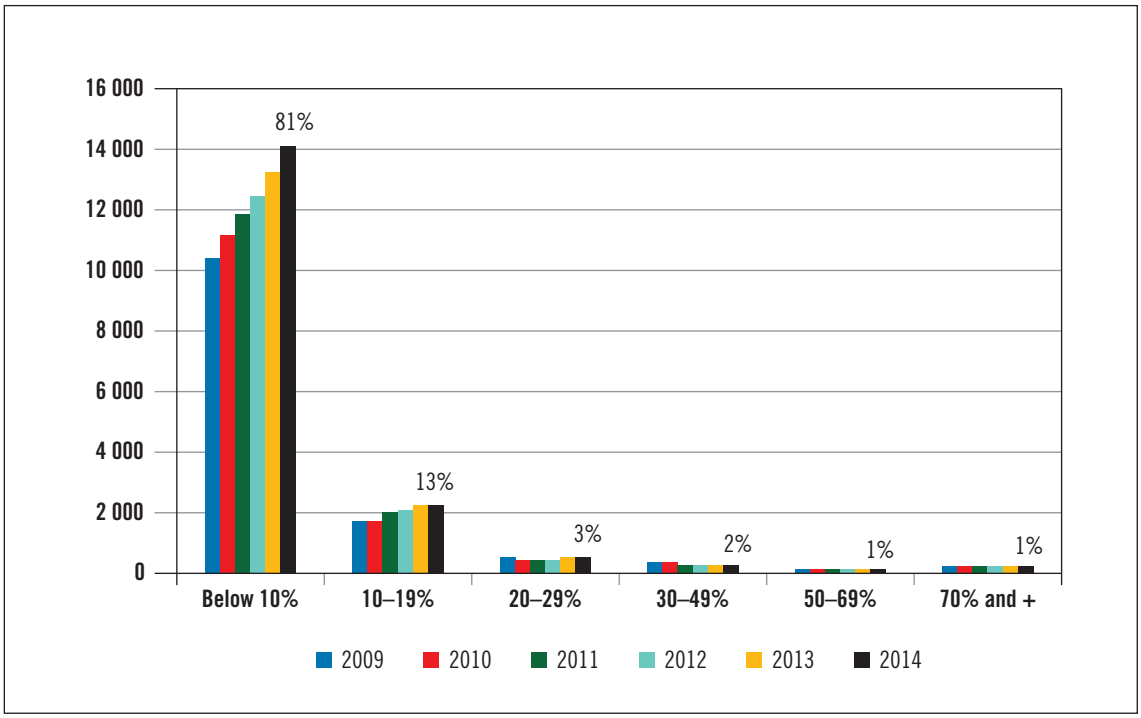
Injuries	Malaysia	British Columbia	South Africa	Singapore
Amputation – upper limbs (either arm)				
(1) Amputation through shoulder joint	90	70	65	75
(2) Amputation below shoulder with stump less than 8" from tip of acromion	80	65–70	65	75
(3) Amputation below 8" from tip of acromion to less than 41/2" below tip of olecranon	70	55–60	55–65	70–75
(4) Loss of a hand or of the thumb and four fingers of one hand or amputation from 41/2" below tip of olecranon	60	50–55	50 to 55	70
(5) Loss of thumb	30	10	25	30
(6) Loss of thumb and its metacarpal bone	40	20	29	36
(7) Loss of four fingers of one hand	50	30	40	60
(8) Loss of three fingers of one hand	30	19–22	18–24	35–46
(9) Loss of two fingers of one hand	20	8–14	10–18	20–35
(10) Loss of terminal phalanx of thumb	20	4	15	20
Amputation – lower limbs				
(11) Amputation of both feet resulting in end-bearing stumps	90	50	70–90	100
(12) Amputation through both feet proximal to the metatarso-phalangeal joint	80	20–50	70–90	70
(13) Loss of all toes of both feet through the metatarso-phalangeal joint	40	10–20	30	
(14) Loss of all toes of both feet proximal to the proximal inter-phalangeal joint	30	10	30	
(15) Loss of all toes of both feet distal to the proximal inter-phalangeal joint	20	10		40
(16) Amputation at hip	90	65	70	75
(17) Amputation below hip with stump not exceeding 5" in length measured from tip of great trenchanter	80	50–65	45–70	75
(18) Amputation below hip with stump exceeding 5" in length measured from tip of great trenchanter but not beyond middle thigh	70	50	45–70	75
(19) Amputation below middle thigh to 31/2" below knee	60	35–50	35–70	65–75

Table 6.4 continued on page 69

Table 6.4 continued from page 68

Injuries	Malaysia	British Columbia	South Africa	Singapore
(20) Amputation below knee with stump exceeding 31/2" but not exceeding 5"	50	35–45	35–45	65
(21) Amputation below knee with stump exceeding 5"	40	35–45	35–45	65
(22) Amputation of one foot resulting in end-bearing	30	25	35	55
(23) Amputation through one foot proximal to the metatarso-phalangeal joint	30	10–25		35
Other injuries				
(24) Loss of all toes of one foot through the metatarso-phalangeal joint	20	5–10	15	20
(25) Loss of one eye, without complications, the other being normal	40		30	50
(26) Loss of vision of one eye without complications or disfigurement of eye-ball, the other being normal	30	16	30	50
(27) Permanent total loss of hearing in one ear	20	3	7	30
Index finger				
(28) Whole	14	4	10	14–21
(29) Two phalanges	11	2.4	8	11
(30) One phalanx	9	0.8	5	9
(31) Guillotine amputation of tip without loss of bone	5			
Middle finger				
(32) Whole	12	4	8	12–15
(33) Two phalanges	9	2.4	6	9
(34) One phalanx	7	0.8	4	7
(35) Guillotine amputation of tip without loss of bone	4			
Ring or little finger				
(36) Whole	7	2.5	4–6	7–10
(37) Two phalanges	6	1.5	3–5	6
(38) One phalanx	5	0.5	2–3	5
(39) Guillotine amputation of tip without loss of bone	2			
Great toe				
(40) Through metatarso-phalangeal joint	14	5	7	14–23
(41) Part, with some loss of bone	3	1–2.5	3	3–14
Any other toe				
(42) Through metatarso-phalangeal joint	3	1–2	1	7
(43) Part, with some loss of bone	1	0.5–1	1	1–3
Two toes of one foot, excluding great toe				
(44) Through metatarso-phalangeal joint	5	2–3	3	
(45) Part, with some loss of bone	2	1–1.5	3	
Three toes of one foot, excluding great toe				
(46) Through metatarso-phalangeal joint	6	3–4	5	
(47) Part, with some loss of bone	3	1.5–2	5	
Four toes of one foot, excluding great toe				
(48) Through metatarso-phalangeal joint	9	4–5	7	
(49) Part, with some loss of bone	3	2–2.5	7	

Figure 6.3 Number of permanent disablement benefit recipients, by percentage of disablement, 2009–14 (% of 2014 awards)



- Concerning other injuries, the Malaysian schedule is more generous than British Columbia, more generous or equivalent than South Africa and less generous than Singapore for the loss of one eye or hearing in one ear. For the loss of fingers or toes, the Malaysian schedule is more generous than the schedules of British Columbia and South Africa and equivalent to the schedule of Singapore.

SOCSO annually reports statistics on the number of accidents and benefits paid according to type of injury (see table 7 of the statistical reports), but the types of injuries reported are not readily linked to the injuries of the Second Schedule to facilitate a more quantitative analysis. Further quantitative analysis of the Second Schedule would call for more detailed data.

In general, the Second Schedule of Malaysia appears generous when its percentages are compared to those for three other schemes. However, the way it is applied by the medical board in the process of determining the permanent disablement percentage of injured workers can affect its financial impact. The resulting effect from the schedule application and the accident experience is revealed by the number of permanent disablement benefit recipients according to the percentage of disablement. Figure 6.3 shows this number over the period 2009–14. It can be observed that the vast majority of beneficiaries are awarded a disablement percentage of less than 10. Among awards in 2014, 94 per cent were determined at less than 20 per cent disablement while 1 per cent of them were determined at more than 69 per cent. The trend seems stable over the observed period. Should the financial burden of permanent disablement benefits be a concern, the Second Schedule does not offer efficient leverage, given the pattern weighing toward a large number of cases with a small degree of disablement. The focus should be, then, more on a method of compensation that is currently based on the life pension proportional to the degree of disablement. If for any reason, the revision of the Second Schedule is contemplated, an analysis of its application in the process of determining the permanent disablement percentage should be realized beforehand in close collaboration with SOCSO staff members, for whom the Second Schedule is an important tool. Such an analysis would provide insight for designing statistics useful in monitoring the award of benefits. The reflection on the Second Schedule should examine its limitations in meeting the goal of adequately compensating loss of earnings.

Figure 6.4 Distribution of number of permanent disablement benefit recipients, by percentage of disablement and corresponding costs, 2014

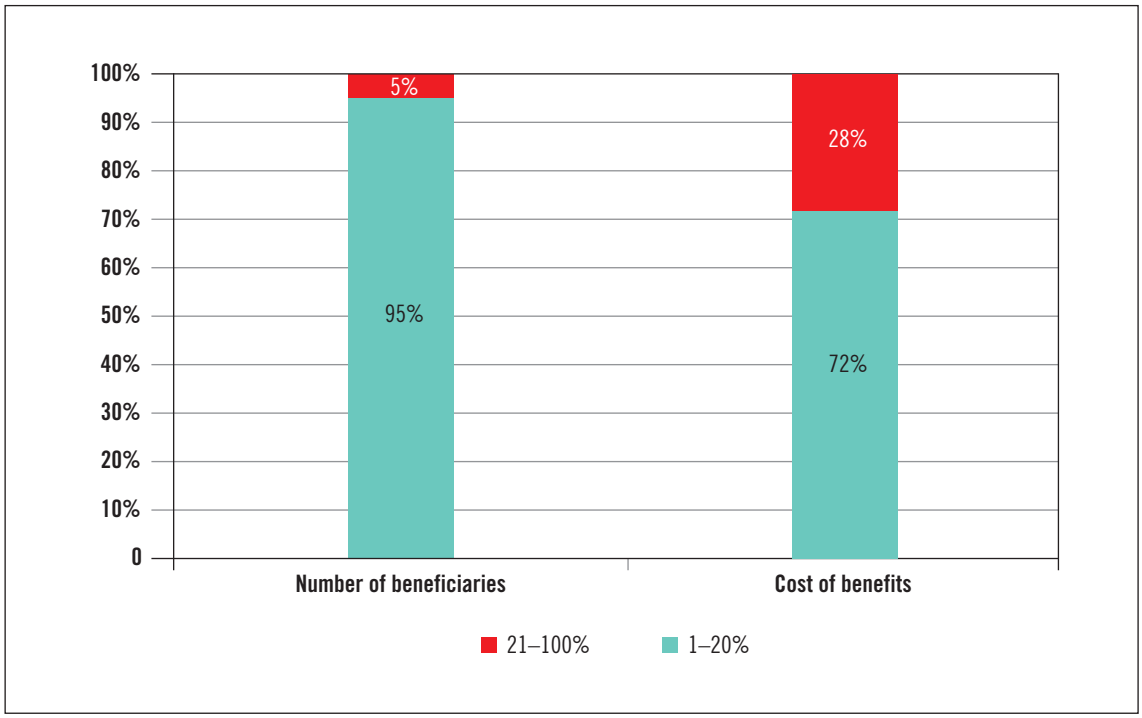


Figure 6.4 illustrates the relative weight of cases below and above 20 per cent of disablement. It can be observed that the major share of the scheme's resources goes to light disablement cases. The current method of compensation should be re-examined to assess its pertinence in providing adequately protection to injured workers, which would ensure equity among injured workers of different ages and with different degrees of disablement.

Return to Work Programme

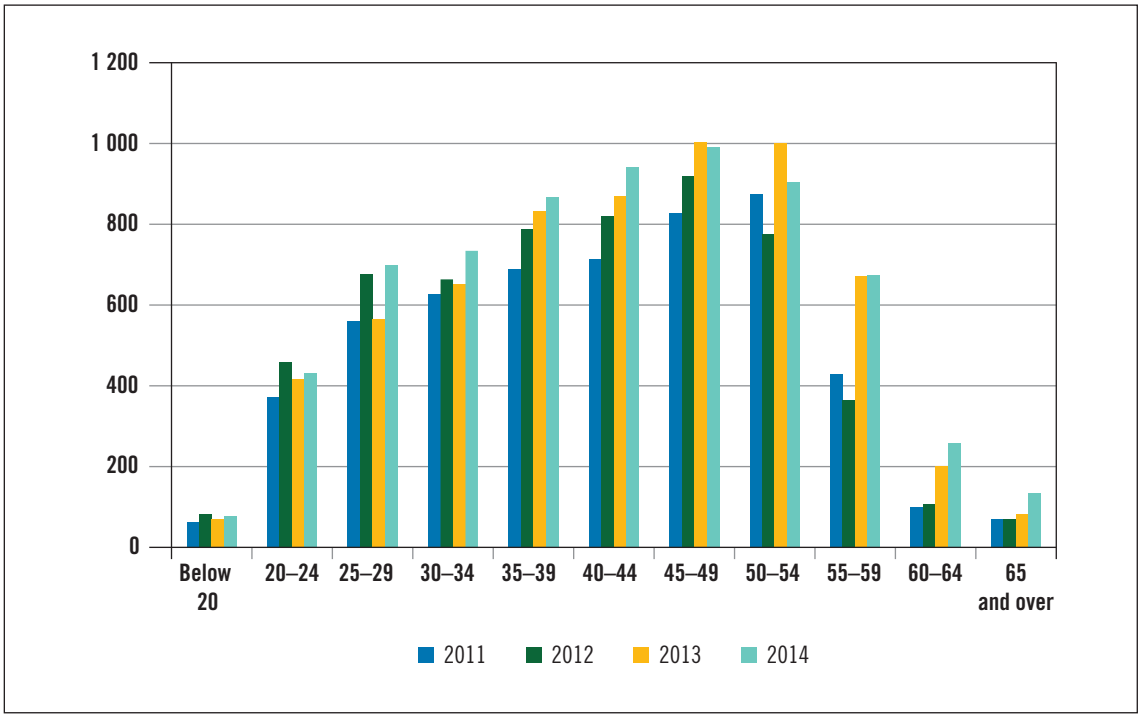
SOCSO has asked that the impact on the Fund of the establishment of the Return to Work (RTW) Programme and its operational costs be examined in this actuarial review.

The EI and IS schemes provide protection to employees and their eligible dependants in the occurrence of employment injury, invalidity and death. The schemes' benefits include rehabilitation facilities for injured employees. The RTW Programme was introduced in 2007 to enhance the facilities for physical or vocational rehabilitation. The Programme provides physical rehabilitation facilities to insured persons who suffer from disability due to injury or illness, in order to restore physical and mental functions so that they can safely return to their work as early as possible after recovery.

The RTW Programme is implemented through a systematic disability management approach, where every deserving and motivated case is managed by a case manager who acts as intermediary between the insured person, the treating doctor, the employer, the rehabilitation centres and other involved parties to ensure that every problem and obstacle that the insured person faces can be overcome as soon as possible through the best approach possible. The implementation of the RTW Programme is based on the concept of early intervention and utilizes a bio-psychosocial approach according to which the provision of comprehensive rehabilitation services contributes to accelerate the recovery of the insured person.

SOCSO has established agreements on services and prices with about one hundred private rehabilitation centres and can rely on its own rehabilitation centre in Melaka since October 2014 (discussed more specifically in the next section).

Figure 6.5 Number of physical and vocational rehabilitation cases approved, by age group, 2011–14



The disability management process starts with the referral of cases by the medical board, the appellate board, the special appellate medical board, doctors or employers. The cases referred are screened by the case managers if the following criteria are met:

- the insured person is receiving temporary disablement benefits;
- the insured person has applied for permanent disablement benefits and has been referred to the Return to Work Programme by the medical board;
- the insured person is less than 50 years old and has been certified not invalid and has been referred to the Return to Work Programme by the medical board;
- the insured person is less than 40 years old and has been certified invalid but is still interested in returning to work.

Figure 6.5 shows the number of physical and vocational rehabilitation cases approved according to age group for the years 2010–14. The pattern by age has reached a certain stability over the last four years.

It is not possible to evaluate the benefits of the RTW Programme with precision. The expenses related to the Programme can be known and accounted for, but an evaluation of the benefits of the Programme must be subjective and depend on many factors. In theory, a proper way to adequately evaluate the benefits of the Programme is to analyse, for several years, two similar groups of disabled workers, one benefiting from the Programme and the other not benefiting from it. The costs of disability benefits for the two groups can then be compared to evaluate the savings. Even using this method, subjective elements will subsist, as it is very difficult to select two similar groups in terms of age, gender, disability cause, salary, education and motivation. Furthermore, since the savings last over the disability period, the use of assumptions for putting a value on future savings is unavoidable.

Another way to estimate the benefits of the RTW Programme would be to compare the costs of disability benefits for disabled workers in two geographic areas, one with the RTW Programme, the other without. The key indicators are the average number of days of disability before return to work and the percentage of disabled workers who return to work.

Table 6.5 Experience of the Return to Work Programme, 2011–14

	2011	2012	2013	2014
Approved cases for rehabilitation (i.e. programme beneficiaries, whether successfully returned to work or not)	5 342	5 737	6 357	6 714
Number of participants rehabilitated (i.e. who have successfully returned to work)	1 812	1 964	1 757	2 583
Rehabilitation cost (MYR millions)	18.14	22.49	26.09	30.15
EI	10.31	12.42	13.81	15.89
IS	7.83	10.07	12.29	14.26
RTW cost (MYR millions)	1.63	1.76	1.53	2.04
EI	1.33	1.39	1.23	1.58
IS	0.30	0.37	0.30	0.46
RTW emoluments (MYR millions)	n.a	n.a	n.a	3.63
RTW staff members	n.a	n.a	n.a	61
TD average duration (days)	49	50	53	55
RTW cost / Rehabilitation cost (%)	9	8	6	7
RTW cases / Approved cases (%)	34	34	28	38
RTW cost per participant rehabilitated (MYR)	901	896	871	789

Note: n.a.= not available.

The efficacy of the Programme can be measured in terms of the number of temporary disability benefit days saved or in terms of the number of disabled workers returning to work.

Table 6.5 presents selected observed data for the period 2011–14 which puts the costs of the RTW Programme and the overall rehabilitation facilities in perspective. The cost of the rehabilitation facilities and of the RTW Programme represent respectively 1.21 and 0.08 per cent of the benefits paid in 2014.

Table 6.5 shows that the Programme's average cost per successfully rehabilitated participant, excluding staff emoluments, decreases over the period 2011–14. The average cost represents the savings needed per RTW case to break even. If the emoluments are included in the cost, the breakeven savings in 2014 would rise from MYR 789 to 2,195, a sum which would have to be achieved for each of the 2,583 rehabilitated cases. The available data do not allow the breakeven costs to be determined by branch, but it is expected that the RTW experience would be different between the EI and IS branches. Without further detailed data, the analysis of the RTW Programme can only be limited. Nevertheless, for illustration purposes, table 6.6 presents two breakeven levels for the cost of the Programme in 2014.

The result of 39 cases of EI pension awards means, other things being equal, that to be financially neutral the RTW Programme must permit a reduction in the number of EI pension awards by at least 39 – or by another number of cases with a different combination of characteristics such as age, gender, pension amount and degree of disability, resulting in an equivalent amount of reserve. Under the breakeven scenario in table 6.5, in absence of the RTW Programme the number of EI pension awards would be higher (866 + 39). Similarly, the result of 31 cases of IS pension awards means, other things being equal, that to be financially neutral the Programme must permit a reduction in the number of IS pension awards by at least 31 – or another number of cases with a different combination of characteristics such as age, gender, pension amount and degree of disability, resulting in an equivalent amount of reserve.

Table 6.6 Return to Work Programme, EI and IS breakeven based on 2014 experience

Cost of Programme	(MYR) 5 670 431	
Number of beneficiaries of Programme		2 583
Average technical reserve of EI pension awards	146 800	
Number of EI pension awards		866
Number of EI pension awards to breakeven		**39**
Average monthly pension of IS awards	1,009	
Number of IS pension awards		5,905
PV of a monthly pension equal to MYR 1 at age 47	182	
Number of IS pension awards to breakeven		**31**

Despite the simplistic approach to determining the above indicators and their relatively low levels, drawing a conclusion to assess on the benefits of the Programme is not easily feasible; the potential reduction requires the establishment of a benchmark number of awards (in the absence of the Program). More refined measures can be developed to provide more meaningful analysis for monitoring the Programme's impact and efficiency. As the rationale for the RTW Programme and, broadly, the rehabilitation facilities, is not questioned,[5] their financial sustainability is definitely worth the effort to collect the detailed data required by more refined measures. Cost control can follow three avenues: the number of cases can be controlled through the case referral process (identification of cases with high probability of success), the expenses per case through agreements with service providers on selected services and reimbursed prices; and the duration of the Programme through a monitoring and review process.

SOCSO Rehabilitation Centre

SOCSO has asked that the impact on the Fund of the establishment of the Rehabilitation Centre and its operational costs be examined within this actuarial review.

The SOCSO chairman stated in the 2014 Annual Report: "The establishment of the Rehabilitation Centre became a landmark success for SOCSO in directly supporting the Return To Work Programme in accordance with the mission and objectives of SOCSO in guaranteeing the safety and social wellbeing of employees."

The centre has been built in Melaka and started operation on 1 October 2014. It provides rehabilitation services based on a bio-psychosocial concept through rehabilitation modules such as physiotherapy, occupational therapy, optometry, audiology and vocational training. It also provides facilities such as wards and hostels for those in need (150 rooms available for patients and caregivers).

The centre has a workforce of 93 professionals in the fields of allied health, rehabilitation, medicine, disability management and administration. Up to December 2014, a total of 95 patients had received rehabilitation through comprehensive physical and vocational programmes with the objectives to reintegrate the work market and to improve their live.

Figure 6.6 shows the number of referred and admitted cases per month between August 2014 and September 2015. At the end of the first year of operation, 689 cases had been referred to the centre and 374 (54 per cent) had been admitted.

[5] See ILO Convention No. 121, art. 26; and ILO Convention No. 128, art. 13.

Figure 6.6 Rehabilitation Centre, number of cases referred and admitted per month, August 2014–September 2015

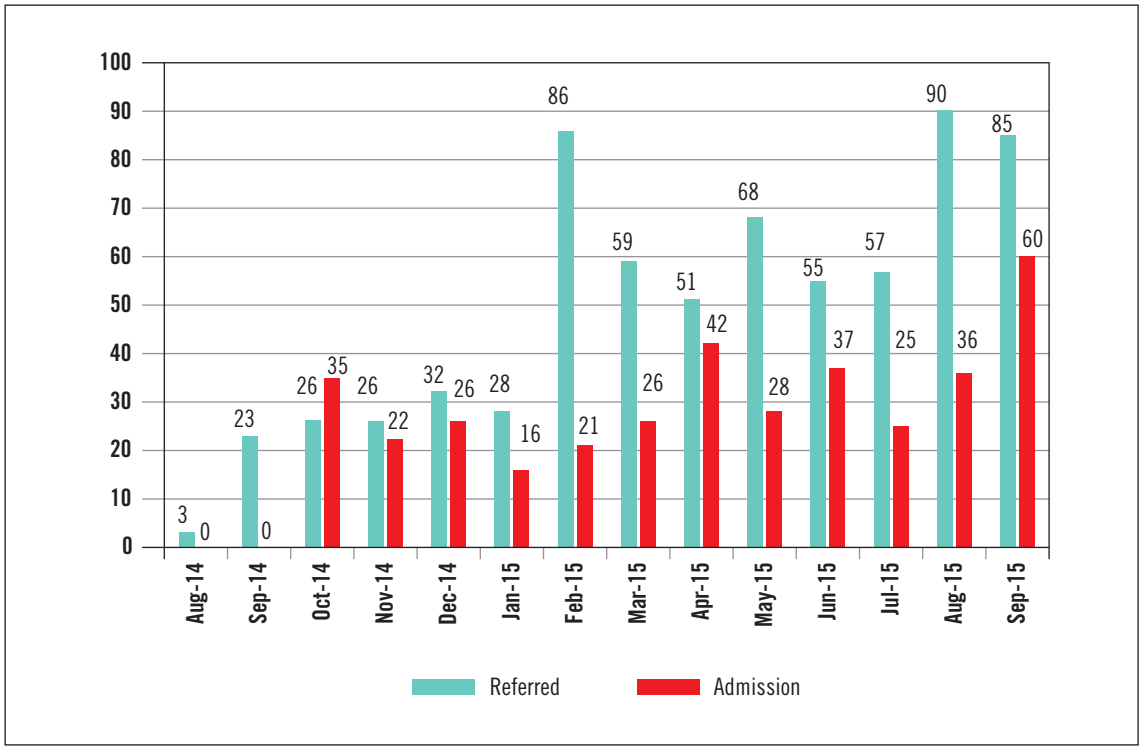


Figure 6.7 Rehabilitation Centre, monthly expenses and chargeables, October 2014–September 2015

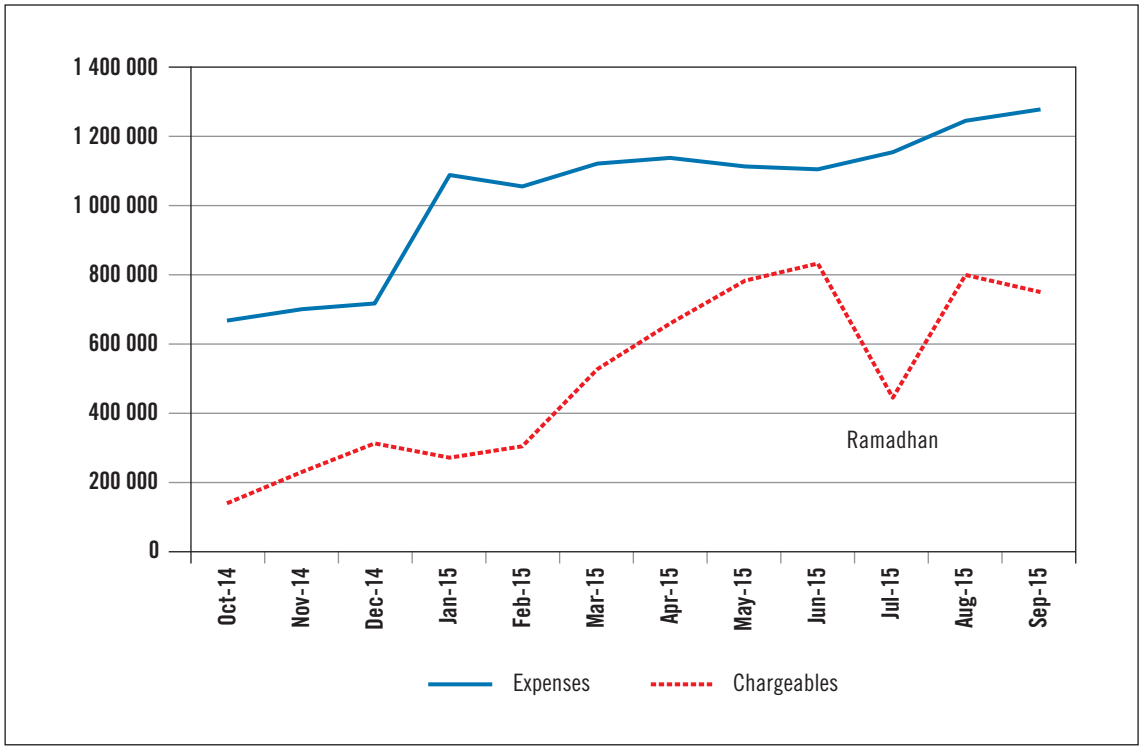


Figure 6.7 shows monthly amounts of expenses and chargeables during the twelve months ending in September 2015, for a total of MYR 12.35 million and 6.01 million respectively. This level of expenditure needs to be conciliated with the observed expenses reported by type for the same period and the budget amounts for 2015 and 2016, as shown in table 6.7.

Table 6.7 Rehabilitation Centre, expenditure October 2014 –September 2015, and budgeted 2015 and 2016 (MYR millions)

	Oct.2014 – Sep.2015	Budget 2015	Budget 2016
Emoluments	0.67	0.82	0.69
Services and supplies	12.20	13.81	9.35
Depreciation of property, plant and equipment	7.36	8.00	8.10
Supply Items	0.03	0.10	0.10
Miscellaneous expenditure	0.29	1.86	0.80
Total	**20.56**	**24.59**	**19.04**

The budget of the SOCSO Rehabilitation Centre can be considered in relation to the expenditure for rehabilitation facilities of MYR 30.15 million in 2014 (table 6.5). The impact of the cases referred to private service providers and the corresponding expenditure will have to be analysed, thus data needs to be collected accordingly.

Table 6.7 reports a decrease in the budget of the centre from MYR 24.59 million in 2015 to 19.04 million in 2016, attributed to the decrease in the budget for services and supplies. The expenditure beyond 2016 is expected to be higher if the management maintains its plan to operate the centre at its maximum capacity, i.e. 350 inpatients and 30 outpatients at a time and around 1,500 beneficiaries a year. The expected yearly operating cost at full capacity would be MYR 35 million, an amount that excludes appliances still to be acquired. In September 2015, the centre was operating at 49 per cent of its full capacity.

SOCSO provides rehabilitation facilities in the attempt, first, to give back to disabled workers a level of autonomy in their daily life, from personal care (feeding, hygiene, toileting, bathing and dressing) to coping with their environment (shopping, cooking, housekeeping, laundry, use of transport, managing money, managing medication and the use of the telephone); and second, to help them re-enter the job market. SOCSO has looked for ways to improve its capacity to meet these objectives. In the wake of the introduction of the RTW Programme in 2007, SOCSO launched the project of building its own rehabilitation centre to give itself a powerful means of providing intensive and complete rehabilitation treatment in one place. Of course, the building and the operating of the centre are expensive and SOCSO's objectives in providing rehabilitation facilities depends on long-term financial sustainability of the centre.

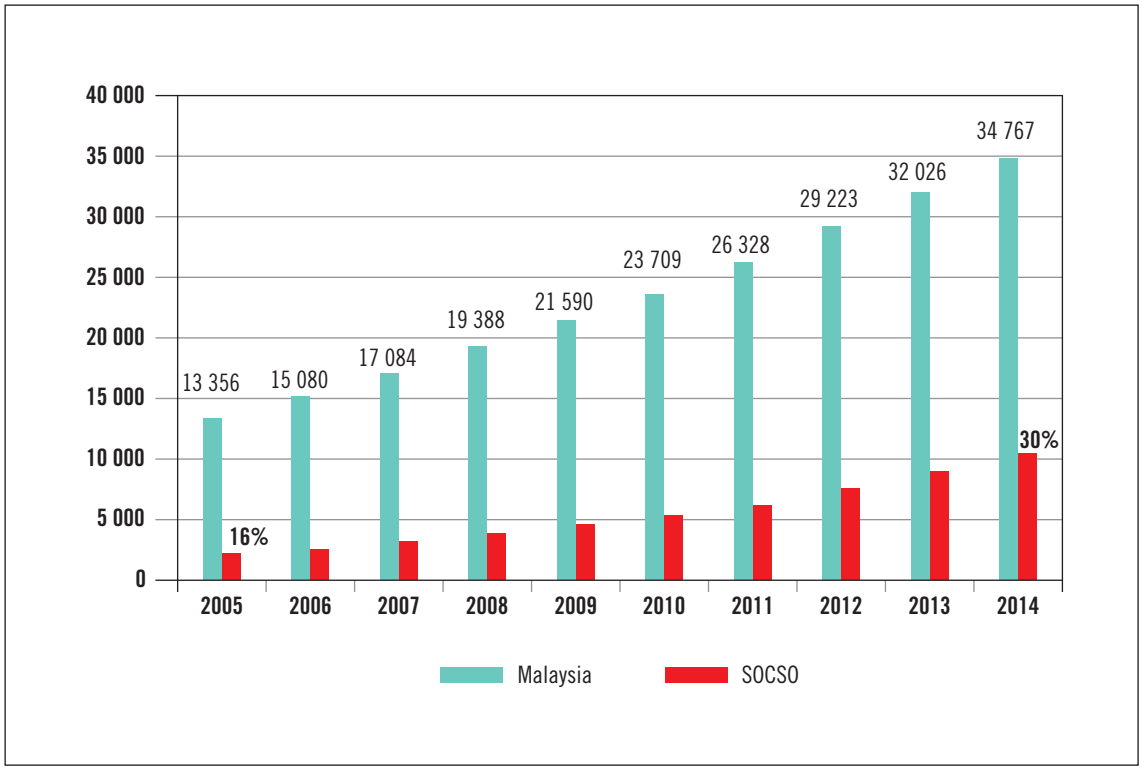
Beyond savings on the cost of invalidity and disability benefits, and constant attendance or institutional care whenever a disabled or invalid worker is successfully rehabilitated, operating the SOCSO Rehabilitation Centre efficiently is crucial. Although the centre is unique of its kind, useful benchmarks can still be derived from private service providers. It should be noted that the Employees' Social Security Bill (2014 Amendment) has proposed that the centre be incorporated as a company for the sake of managerial efficiency.

Dialysis treatment

SOCSO's presentation of its dialysis centres on its website[6] describes the rationale for its support stemming from the Employees' Social Security Act. The SOCSO dialysis unit was established in 1998 under the Medical and Rehabilitation Branch and is now part of the IS scheme. Services provided

[6] http://www.perkeso.gov.my/en/social-security-protection/panel-clinics-dialysis-centres/dialysis-centre.html.

Figure 6.8 Number of patients on dialysis in Malaysia, and those insured by SOCSO, 2005–14



Sources: Malaysian Dialysis and Transplant Registry, 22nd report; SOCSO Annual Reports.

include haemodialysis treatment for qualified insured persons suffering from chronic renal disease and end stage renal failure. Treatment is provided free of charge at any SOCSO dialysis centre, government hospital, NGO centre or private dialysis centre.

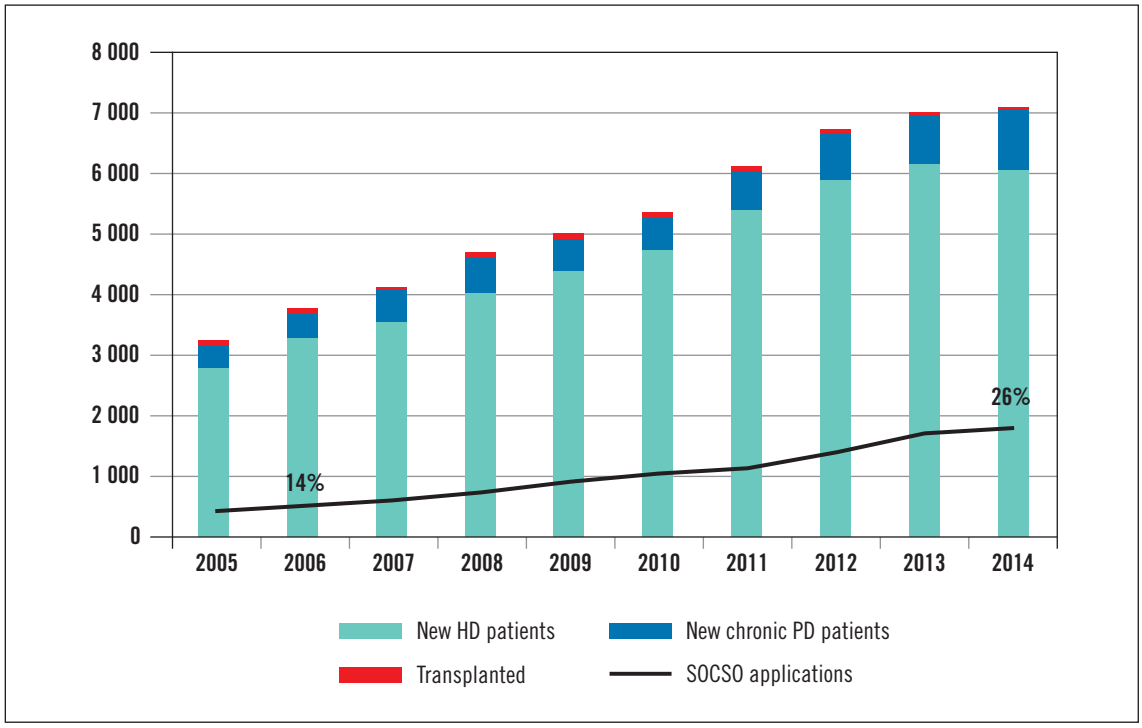
SOCSO's goal is to provide adequate treatment to an insured population facing increasing risks of end stage renal failure while keeping its costs under control. In 2014, the cost of dialysis represented 10 per cent of total IS benefits; it has increased by 29 per cent since 2013 and doubled since 2010 (see table 4.1). Several factors have driven up the cost of dialysis: the number of new cases, the cost per treatment and the duration of treatment provision.

The primary causes of end stage renal failure include diabetes and hypertension, which represent respectively 61 and 18 per cent of new dialysis patients in Malaysia in 2014, according to the 22nd report of the Malaysian Dialysis and Transplant Registry. Unfortunately, the incidence of diabetes is expected to increase further as the economy continues to develop. Figure 6.8 shows an increasing trend in the number of patients on dialysis in Malaysia and highlights the faster increase in the number of patients insured by SOCSO.

Figure 6.9 shows an increasing trend in the number of new patients on dialysis in Malaysia by type of treatment, and the number of applications received by SOCSO. It should be noted that the rate of approval by SOCSO is historically very high, at 100 per cent in 2014.

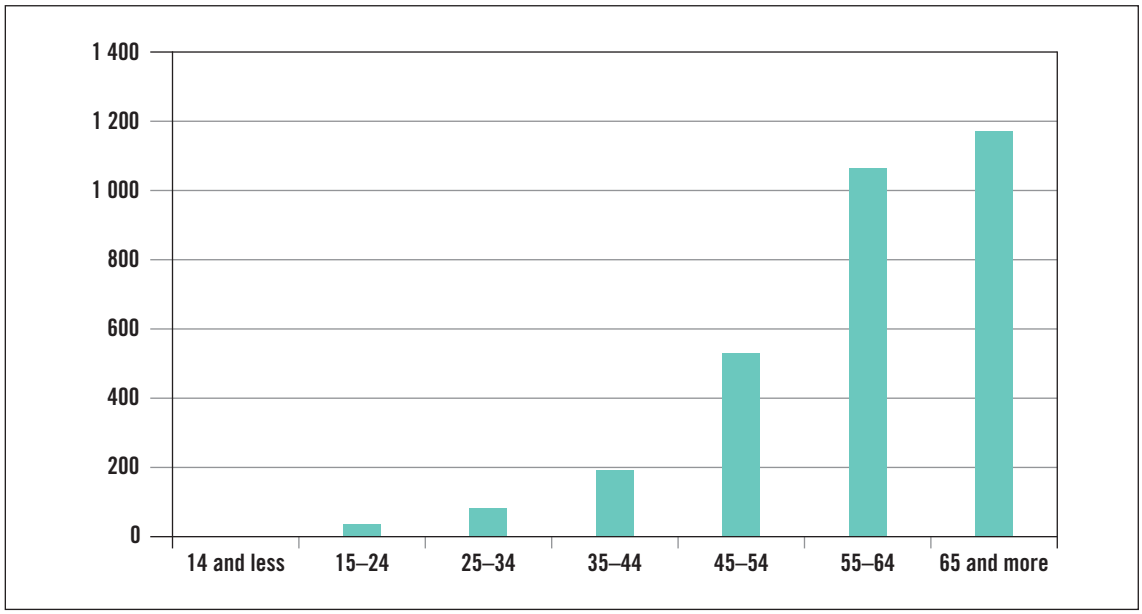
The extension of the age limit of SOCSO coverage from 55 to 60 since 1 January 2013 has substantially contributed to the increase in the number of dialysis beneficiaries. The impact is amplified by the age effect, as the prevalence rate of kidney diseases is expected to be higher at older ages. Figure 6.10 shows that the number of patients per million population in the age group 55–64 is significantly higher than for those in the age group 45–54.

Figure 6.9 Number of new patients on dialysis in Malaysia, and number of applications to SOCSO, 2005–14



Sources: Malaysian Dialysis and Transplant Registry, 22nd report; SOCSO Annual Reports.

Figure 6.10 Dialysis treatment rate, by age group, 2014 (per million population)

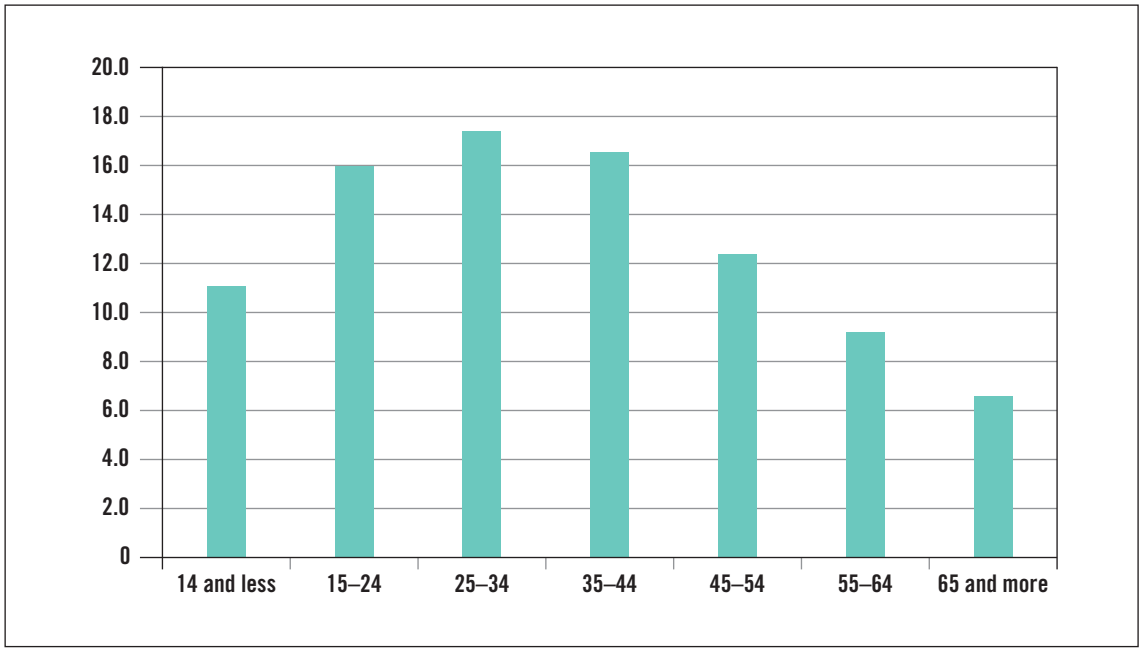


Source: Malaysian Dialysis and Transplant Registry, 22nd report.

According to a 2005 study,[7] the cost per haemodialysis (HD) treatment ranged from MYR 79.61 to 475.79, with a mean cost of MYR 169, while the cost of continuous ambulatory peritoneal dialysis (CAPD) ranged from MYR 1,400 to 3,200 per patient per month, with a mean of MYR 2,186. The

[7] L.S. Hooi et al.: "Economic evaluation of centre haemodialysis and continuous ambulatory peritoneal dialysis in Ministry of Health hospitals", in *Malaysia Nephrology* (2005, Vol.10, No.1), pp. 25–32.

Figure 6.11 Life expectancy at starting dialysis, by age group



Source: Malaysian Dialysis and Transplant Registry, 22nd report.; and authors' calculation.

average annual cost is similar for both types of treatment. The personnel cost consumes 18.9 per cent of total cost, while consumables and drugs consume 26.4 per cent of all costs.

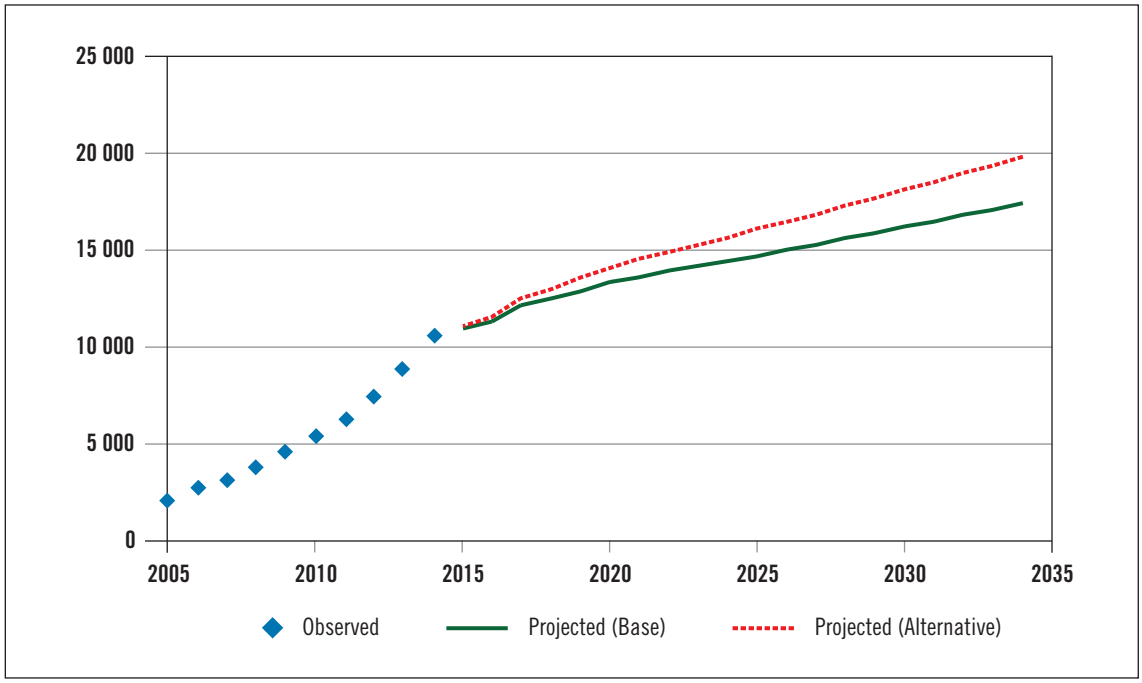
According to the National Kidney Foundation (NKF), private medical facilities usually charge MYR 150 to 250 for each dialysis session. Through fundraising, NKF is able to charge MYR 90 per dialysis treatment.[8] The NKF assists the patient to apply for a subsidy of MYR 50.00 per dialysis treatment given by the Ministry of Health so that the NKF patient can be charged MYR 40.00 per dialysis session. The patient must be willing to undergo four hourly dialysis treatments three times a week at the NKF Dialysis Centre, at the dates and times fixed by the Centre. Based on three sessions per week, the NKF annual cost per patient is about MYR 22,000 (including charges and subsidies) while the charge in private medical facilities is between MYR 23,400 and 39,000. Compared to these levels, the average cost of MYR 14,971 per patient insured under SOCSO in 2014 seems on the low side.

The number of patients on dialysis is also influenced by their survival rate. The two main causes of death among persons on dialysis t are cardiovascular disease and sepsis. Based on the Malaysian statistics over the period 2005–14, life expectancy at starting dialysis is about 11 years. However, it is very sensitive to the age at starting dialysis, as shown in figure 6.11.

The base scenario considered in this actuarial valuation assumes that the prevalence rate of dialysis (number of insured beneficiaries divided by the number of insured workers) by age, based on SOCSO experience of the period 2011–14, is constant over the projection period. It is also assumed that no beneficiary survives beyond age 69. An alternative assumption of the prevalence rate is considered, to take into account the extension of coverage in 2013 and patient survival beyond age 69. Figure 6.12 shows the projected number of IS branch dialysis beneficiaries over the next 20 years under the base scenario and an alternative scenario of prevalence rate.

[8] The NKF is a non-profit charity organization (http://www.nkf.org.my). Every year, it needs to raise MYR 12 million to subsidize the cost of dialysis for 1,519 patients who seek treatment at its 26 dialysis centres nationwide (as at May 2016).

Figure 6.12 Number of dialysis beneficiaries, IS branch, 2005–34



The average annual cost per patient is assumed to increase from the 2014 level at the growth rate of the average wage. Figure 6.13 shows the projected cost of providing dialysis treatment under the IS branch of SOCSO over the next 20 years. The annual cost is expressed as a percentage of the insured salary bill. SOCSO has estimated that the cost of dialysis in 2020 would be MYR 310.73 million, which can be compared to MYR 304.44 million under the base scenario and 321.91 under the alternative scenario.

The sustainability of the SOCSO dialysis programme is crucial, as the cost of dialysis is not affordable to many low-income earners. Sustainability depends on SOCSO's ability to control the number of new beneficiaries in the context of an increasing number of insured persons suffering kidney diseases. Data on dialysis beneficiaries should be available by age, sex and year of starting dialysis in order to refine the analysis of future cost developments. Sustainability also depends on SOCSO's capacity to control the cost of providing dialysis treatment. Data on components of the cost should be available to allow better analysis and provide ways of improving service delivery. SOCSO participation in national monitoring on kidney diseases would enlarge its perspective and enrich its palette of solutions.

Health Screening Programme

SOCSO has asked that the impact on the Fund of the implementation of the Health Screening Programme (HSP) and its operational costs be examined in this actuarial review.

Launched on 18 February 2013, the HSP offers free health screening to all insured persons at least 40 years old and actively contributing. The objectives of the Programme are:

- to identify high-risk groups of employees with non-communicable diseases (NCD) and to cultivate a healthy lifestyle;
- to detect non-communicable diseases at an early stage;
- to prevent the reduction or loss of income caused by non-communicable diseases; and
- to enhance human capital resources and productivity through a healthy working environment.

Figure 6.13 Cost of dialysis, IS branch, 2015–34 (% of insured salary bill)

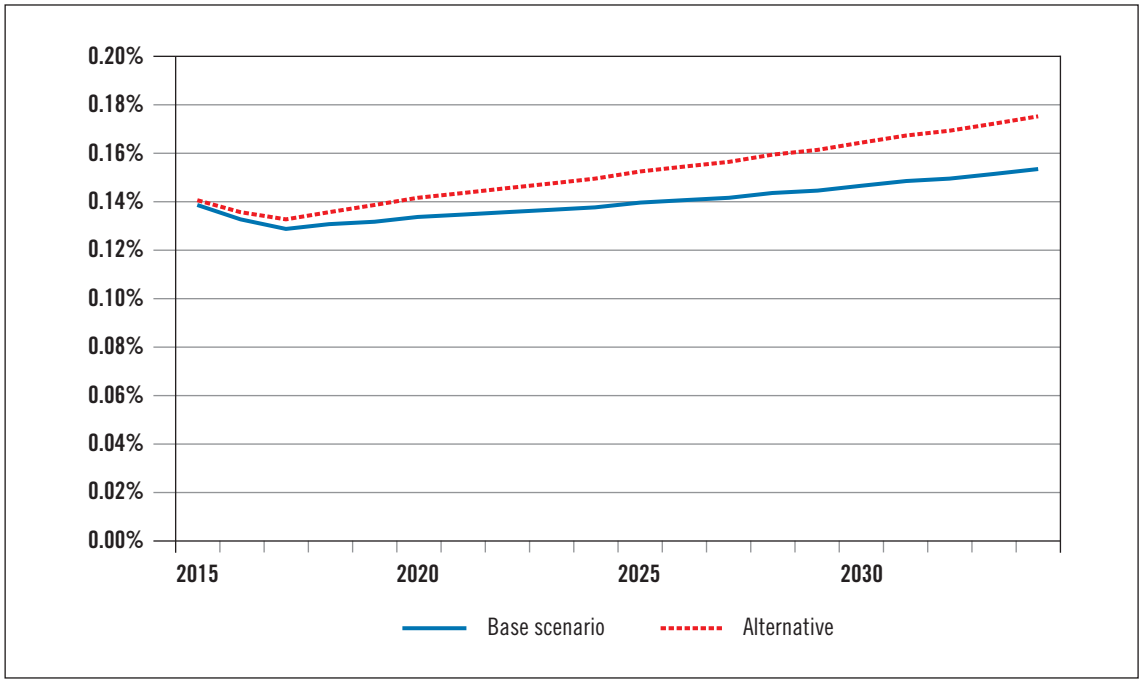


Table 6.8 Health Screening Programme, expenditure and average cost per screening, 2013–14

	2013	2014	2013-14
Expenditure (MYR million)	29.35	16.57	45.92
Number of beneficiaries	260 703	126 070	386 773
Average cost (MYR)	113	131	119

According to SOCSO and based on 2000–14 data, non-communicable diseases are the cause of between 35 and 49 per cent of reported claims for Invalidity Pension benefit and almost half of reported claims for Survivors' Pension benefit.[9]

Table 6.8 summarizes the expenditure and number of beneficiaries of the HSP for its first two years in operation. Although the totals indicate an average cost per beneficiary of MYR 119, the average cost for females is higher than for males as the HSP facilities for females probably include mammograms and pap smear sin addition to physical examinations and blood tests for all. Even if the average cost is higher in 2014 at MYR 131, it is relatively low comparing to what is charged outside the HSP. For example, a basic medical check-up at government clinics can cost around MYR 150–200.[10] SOCSO's capacity of negotiating lower health screening costs represents a net collective advantage.

Based on the screenings realized in 2013 and 2014, the main findings of the Programme according to the HSP Fact Sheet 2013–2014 are:

- only 33.3 per cent of beneficiaries had health screening before implementation of the Programme by SOCSO;
- 9.3 per cent are diagnosed with diabetes and 16.3 per cent require further tests;
- 27.2 per cent of beneficiaries are diagnosed with hypertension (1.4 per cent at stage 3, 5.6 per cent at stage 2 and 20.2 per cent at stage 1);

[9] http://sehat.perkeso.gov.my/panelclinichtml/pdf_aps2015/aps14.pdf.
[10] http://www.freemalaysiatoday.com/category/money/2014/04/21/medical-screening-packages/.

Table 6.9 Number of HSP beneficiaries by age and sex, 2013–14

	2013		2014	
	Males	Females	Males	Females
Insured 40 and over	1 162 901	678 831	1 217 234	710 510
Number of beneficiaries	142 747	117 956	64 698	61 372
40–44	39 263	38 391	23 630	20 086
45–49	37 336	33 623	17 737	15 867
50–54	32 354	26 783	13 662	13 155
55–59	19 121	12 973	6 726	7 570
60–64	9 261	4 526	2 224	3 037
65 and over	5 412	1 660	719	1 657

Source: Annual Reports 2013 and 2014.

- 24.5 per cent of beneficiaries have high hypercholesterolemia;
- 0.4 per cent of female beneficiaries have abnormal cancer screening results and 28.0 per cent have endometrial cells;
- 1 per cent of female beneficiaries have suspicious and highly suspicious results on mammogram;
- 33.7 per cent of beneficiaries are classified obese (1.2 per cent in class 3, 3.6 per cent in class 2 and 28.9 per cent in class 1); and
- 30.2 per cent of male beneficiaries are smokers.

By the end of 2014, SOCSO had issued 1,965,589 vouchers for screening, of which 260,703 were used in 2013 and 126,070 in 2014, as shown in table 6.9. Should the number of screenings per year stay close to the 2014 level, it will take 13 years to process screenings for the remaining vouchers.

For this valuation, the experience of the Programme was considered insufficient to design a reliable financial projection model based on demographic and economic variables determined from the data. The financial projections rely on an aggregate method described in section A3.5, which considers that the costs incurred in 2013 and 2014 are a reasonable indication of the long-term cost of the Programme, taking into consideration the evolution of the insured population and the economic variables influencing the cost of services. It is expected that uncertainty regarding the change in the future behaviour of beneficiaries will be reduced in the next actuarial valuations so as to use a model based on take-up rates and average costs of services.

It is common sense that awareness and prevention are better than diagnosis and treatment. To maximize the effectiveness of the Programme, it should focus on health promotion as an ongoing process that involves a variety of activities rather than a one-time event. Communication with insured workers and their family about wellness should be carried out on an ongoing, consistent basis to be effective. Proponents of screening programmes stress that in addition to the potential of early disease detection (secondary prevention), they also provide the opportunity for participants to change unhealthy lifestyles through the so-called lifestyle counselling (primary prevention).

Early treatment is expected to have significant impact on life expectancy. Prevention and early treatment are also expected to prevent heavily disabled cases as a result of strokes, heart disease, diabetes complications (amputations, blindness, kidney failure) and so forth. For SOCSO to meet the HSP's objectives, health-care services must be available to take care of the workers from follow-up on testing and diagnosis to counselling, treatment and monitoring.

There are a few approaches to evaluating the Programme's success. They include:

- the health screening take-up rate of eligible workers;
- the evolution of life-style behaviour such as quitting smoking, losing weight and lowering cholesterol to reduce the risk of heart disease, cancer and stroke. It should be noted that the financial benefits of lifestyle changes can take many years to produce results;
- the evolution over the years of the percentages of cases of diabetes, hypertension, hypocholesteremia, smoker cancer and so forth; and
- reduction of the financial burden on SOCSO under the IS scheme regarding benefits due to non-communicable diseases.
- given the level of average technical reserve (MYR 183,594 for a new invalidity pension and 102,008 for a new widow's pension in 2014) and the level of the Programme cost (MYR 45.92 million to provide health screening to 386,773 workers in 2013 and 2014), an indicator of "profitability" would be a breakeven number of benefits prevented among HSP beneficiaries. For 2013–14, that number would be 250 invalidity pensioners, 450 deaths of workers or a combined number of these events. As primary causes of end stage renal failure are diabetes and hypertension, a link to the SOCSO dialysis programme should be monitored;
- productivity gains, i.e. whenever an invalidity or a death of a worker is prevented, the society of Malaysia benefits from the productivity of the worker (e.g. reduction in absenteeism) and SOCSO receives contributions instead of paying benefits on his behalf; and
- sustainability: the cost components of the Programme must be identified and monitored on a regular basis in order to keep the total cost under control and in some relation to the potential benefits.

Reducing the burden of non-communicable disease and promoting healthy lifestyles are two important issues for society because of their economic and social benefits. Investing in the prevention of non-communicable disease and the promotion of healthy lifestyles can be undertaken for the same reasons why diseases and injuries are treated: not only for the economic gains, but because they are the hallmark of a civilized, humane and caring society.

6.3 EXTENSION OF THE EI SCHEME TO FOREIGN WORKERS

As the possibility of extending coverage of the EI scheme to foreign workers is being contemplated, an assessment of the impact of this change is presented in this actuarial valuation. The purpose of analysis is to assess the financial risk relative to the present situation with a view to determining the impact of such an extension on the contribution rate.

Data on foreign workers

The Workmen's Compensation Act 1952 (WC Act) actually provides compensation to foreign workers injured in the course of their employment. Accidents and occupational diseases are covered. Employers are individually liable to pay compensation and any expenses for the treatment and rehabilitation of injured workers. Employers must purchase liability insurance and are subject to penalty if they do not. Benefits provided by the Act are summarized in table 6.10.

The prescribed amounts are very low compared to those available to SOCSO injured workers. Table 6.11 shows the statistical data provided by the Ministry of Human Resources (MOHR) related to benefits paid to foreign injured workers. More details are presented in table A4.2.

Information on exposure to the occurrence of injuries is needed to assess the risk. MOHR has provided statistics on the number of work permits issued every year according to six industry groups, which

Table 6.10 Summary of benefits under the Workmen's Compensation Act

Category	Description
Medical and rehabilitation	Hospital and medical expenses required for the treatment and rehabilitation of injured workers, including drugs and appliances
Temporary disablement	Waiting period of 4 days, payable if the disablement lasts at least 14 days. Half-monthly payment payable on the 16th day of disablement equal to 1/3 of reference salary (6-month average salary) subject to a maximum of MYR 165. Payable to maximum of 5 years, but any permanent disablement or death benefit will be reduced by the amount paid for temporary disablement in excess of 12 months. Payments may be commuted.
Permanent partial or total disablement	Lump sum equal to 60 months of earnings subject to a maximum of MYR 23,000 times the disablement percentage. Constant attendance allowance equal to 25 per cent of lump sum for severely injured workers.
Death	Lump sum equal to 18 months of earnings subject to a maximum of MYR 18,000 ,or if the deceased has no dependants, the cost of funeral expenses subject to a maximum of MYR 1,000.

Table 6.11 Benefits paid to foreign workers, 2011–15

Year	Permanent disability		Death		Temporary disability		Not classified		Total	
	Number	Average amount (MYR)	Number	Average amount (MYR)	Number	Average amount (MYR)	Number	Average amount (MYR)	Number	Average amount (MYR)
2011	769	2 173	371	7 817	2 625	333	0	n.a.	3 765	2 457
2012	855	1 267	390	6 732	3 200	276	0	n.a.	4 445	1 786
2013	964	183	564	5 809	3 492	877	1	2 415 080	5 021	1 778
2014	1 163	193	726	2 864	4 390	372	6	360 570	6 285	971
2015	1 307	1 591	846	1 552	4 410	341	1	2 122 027	6 564	785

Note: n.a.= not available.

Table 6.12 Number of work permits issued to foreign workers, 2011–15

Year	Domestic workers	Construction	Manufacturing	Services	Plantation	Agriculture	Total
2011	184 092	223 688	580 820	132 919	299 217	152 325	1 573 061
2012	142 936	226 554	605 926	138 823	314 329	143 021	1 571 589
2013	169 936	434 200	751 772	269 321	431 611	193 482	2 250 322
2014	155 591	411 819	747 866	270 048	317 410	170 680	2 073 414
2015	147 003	440 339	760 104	292 021	305 404	194 603	2 139 474

Table 6.13 Comparison of incidence rates per 10,000 workers, 2014

	SOCSO	Foreign workers (MOHR)[1]
Temporary disablement	117.7	26.1
Permanent disablement	34.5	6.9
Death	2.8	4.3

Note: [1] The incidence rates have been calculated using a density of 81 per cent as for SOCSO.

Table 6.14 Distribution of workers, by industry and citizenship, 2014

Industry	SOCSO insured		Employed persons,[1] Non-Malaysian		MOHR data, foreign workers	
	Number ('000)	%	Number ('000)	%	Number ('000)	%
Agriculture, forestry and fishing	178	2.9	517	29.0	488	23.5
Mining and quarry	31	0.5	4	0.2		
Manufacturing	1 057	17.1	355	19.9	748	36.1
Electricity, gas, water and sanitary services	66	1.1	7	0.4		
Construction	416	6.7	251	14.1	412	19.9
Services	2 691	43.4	357	20.0	270	13.0
Trading	*1 136*	*18.3*	*177*	*9.9*		
Accommodation and food and beverage service activities	*293*	*4.7*	*153*	*8.6*		
Transport and storage	*342*	*5.5*	*19*	*1.1*		
Financial and insurance activities	*216*	*3.5*	*5*	*0.3*		
Real estate activities	*705*	*11.4*	*3*	*0.2*		
Other services	1 759	28.4	291	16.3	156	7.5
Total	6 199	100.0	1 782	100.0	2 073	100.0

Note: [1] Labour Force Survey, Malaysia 2014, table A4.14.

may give a valuable indication of the number of foreign workers who could be eligible to coverage by SOCSO. Table 6.12 presents this set of data.

It is interesting to compare the incidence rate of categories of claims on the very simplistic assumptions that all foreign workers are eligible to the WC Act in case of injury (2,073,414 in 2014). Table 6.13 presents the incidence for certain categories of benefits.

The incidence rate for disablement claims of foreign workers is much lower than for SOCSO insured persons, while the incidence of deaths is higher for foreign workers. These results could indicate significant under-reporting of less severe claims on the premise that award conditions of death benefits under the WC Act are similar to those under the SOCSO EI branch. It would be interesting to investigate practices in compensation of foreign workers' claims. There are reasons to believe that only severe cases are reported to MOHR. As the incidence of death is more reliable data, this table suggests that the average risk of foreign workers is higher than for the SOCSO insured.

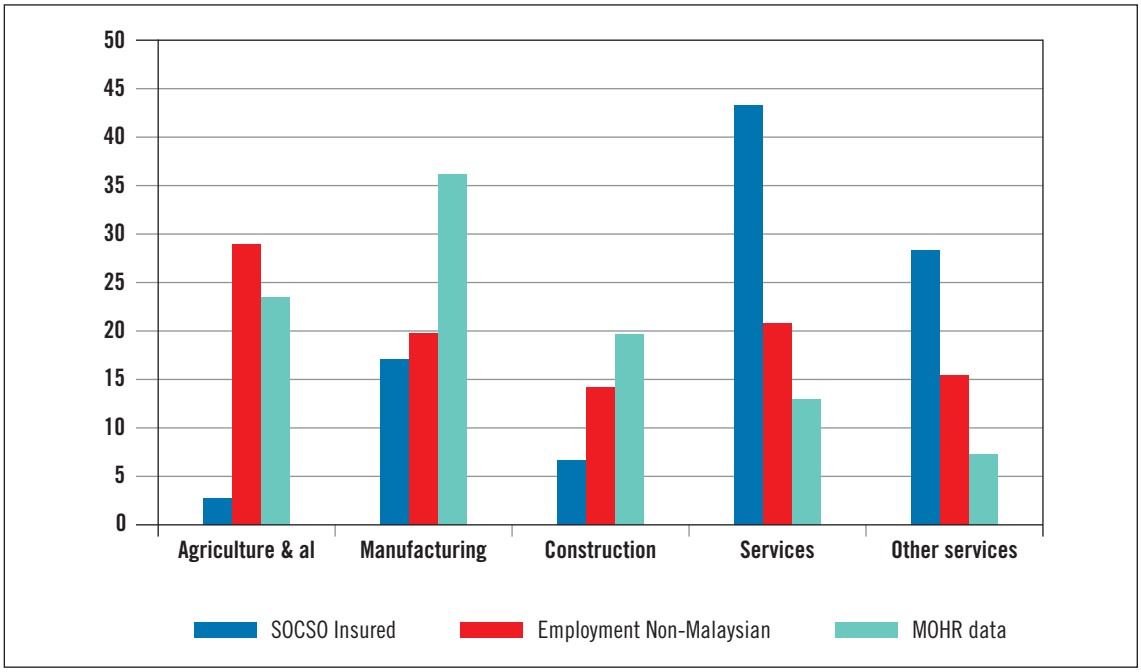
Risk assessment

The incidence and severity of employment injuries varies according to several factors. Among the most important are the industry, the composition of the covered population (age and sex) and the quality of workplaces and commuting networks. Quality of workplace is related to work processes and the occupational health and safety environment. As about half the accidents compensated by SOCSO under the EI scheme are related to commuting, the transport facilities available between home and the workplace, as well as the behaviour of workers on the road, are also risk factors.

To adequately evaluate the impact of extending coverage to foreign workers for the EI scheme, we have to appreciate how the distribution of foreign workers compares to that of SOCSO covered workers.

Table 6.14 shows a comparison of three sets of workers by industry and citizenship for year 2014.

Figure 6.14 Distribution of workers, by industry and citizenship, 2014 (percentages)



Though the distribution of non-Malaysian employed persons and MOHR registered workers do not perfectly match, it is obvious that both these categories are less present in services than SOCSO insured workers. Figure 6.14 provides a simplified picture that highlights this observation.

There seems to be a mismatch between the Labour Force Survey and MOHR data. For manufacturing and construction sectors, the Labour Force Survey reports significantly fewer non-Malaysian employed than MOHR does for foreign workers. In any case, it appears from these data that non-Malaysian workers are more involved in riskier industries than SOCSO insured.

The SOCSO frequency of benefits by industry has been assumed to be applicable to foreign workers in order to assess their risk under SOCSO coverage. Table 6.15 presents this indicator showing temporary, permanent and death benefits.

The frequencies in table 6.15 have been applied to the distributions of non-Malaysian workers in table 6.14 to produce the industry-weighted average frequency by category of benefits presented in table 6.16. For this exercise, since the MOHR set of data contains no detailed information for the service industry, the frequencies in the public sector are considered representative of all subsectors in services, and workers in all services have been allocated to that public sector.

The estimations shown in table 6.16 suggest that the frequency of injuries for non-Malaysian workers could be higher by 15 to 30 per cent than for SOCSO insured workers, due to the industry distribution, other things being equal.

Distribution by age and sex

The distribution by age may have an impact on the incidence and severity of accidents. Figure 6.15 shows the distribution by age, sex and citizenship of employed persons. No age distribution is available for the MOHR set of data.

Figure 6.15 indicates that SOCSO workers are slightly older than non-Malaysian employed persons. The average difference is not material, namely 1.3 and 0.3 years respectively for males and

Table 6.15 Incidence of accidents, SOCSO insured workers, per 1,000

Industry	Accidents reported	TD paid	PD paid	DB paid
Agriculture, forestry and fishing	11.97	11.32	2.68	0.37
Mining and quarry	14.42	13.88	4.01	0.35
Manufacturing	14.49	14.07	4.32	0.17
Electricity, Gas, Water and Sanitary Services	13.81	11.29	4.13	0.29
Construction	15.74	14.49	3.94	0.37
Trading	8.47	7.87	1.99	0.16
Accommodation and food and beverage service activities	7.01	6.48	1.51	0.09
Transport and storage	12.22	11.32	3.74	0.29
Financial and insurance activities	6.73	5.56	2.27	0.05
Real estate activities	7.72	7.13	2.17	0.16
Other services	8.65	8.05	2.43	0.17
Total	10.22	9.55	2.80	0.19

Table 6.16 Estimation of accident frequency for non-Malaysian workers

	Accidents reported	TD paid	PD paid	DB paid
Estimated frequency				
Non-Malaysian employed persons	11.84	11.15	3.01	0.26
MOHR foreign registered workers	13.28	12.59	3.54	0.26
Ratio to SOCSO frequency				
Non-Malaysian employed persons	1.16	1.17	1.08	1.37
MOHR foreign registered workers	1.30	1.32	1.26	1.41

Figure 6.15 Distribution of employed persons, by age, sex and citizenship (percentages)

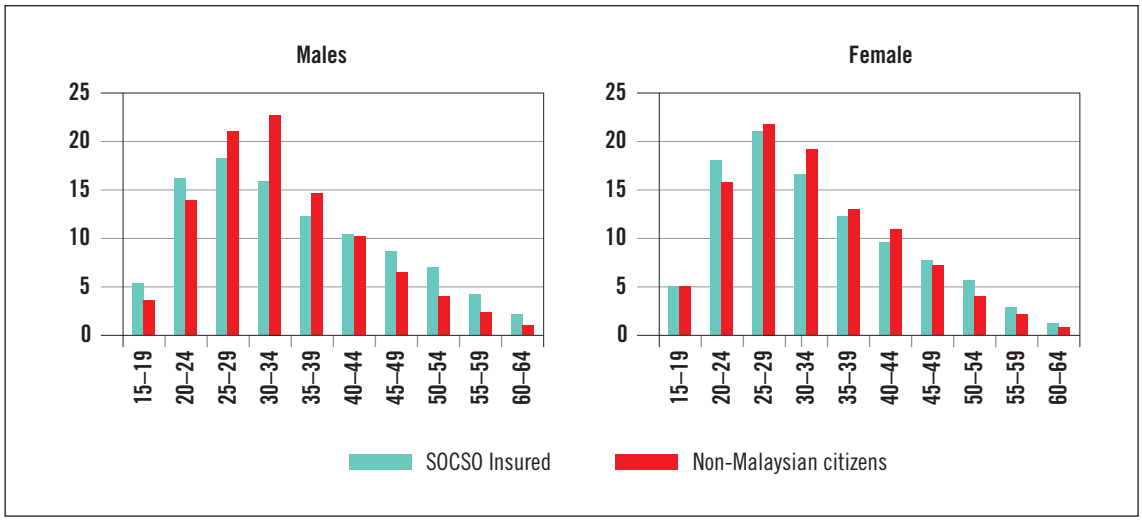


Table 6.17 Distribution of employed persons, by sex and citizenship

Data	Male	Female	Total
SOCSO	0.58	0.42	1.00
Malaysian employed	0.60	0.40	1.00
Non-Malaysian employed	0.71	0.29	1.00
MOHR 2015	0.81	0.19	1.00

females. As the age difference is relatively small, it would not explain much of the total frequency difference.

A more significant difference is observed in the distribution by sex. Table 6.17 presents the distribution of four sets of data. In MOHR data, this distribution is available for 2015 only. The fact that SOCSO experience differs by sex suggests that projections for foreign workers should be made on a sex-disaggregated basis.

Earnings

According to the survey on wages and salaries, the average earnings of non-Malaysian workers would be equal to about 60 per cent of the average earnings of Malaysian workers. There are no data available to assess whether this salary difference would vary by age or sex. It has been estimated that about 60 per cent of the difference is related to the distribution by industry. The rest would be related to other factors such as the experience of workers, or differences between Malaysian and non-Malaysian workers related to occupation or the type of enterprise in terms of work conditions in each industry.

Estimation of contribution rate for non-Malaysian workers

Demographic and financial projections have been performed to assess the impact of the extension of coverage on the contribution rate for the EI scheme. The effective date of extension has been set at 1 January 2017. The key assumptions are presented in table 6.18.

Table 6.19 presents financial projections of the EI scheme if the extension to foreign workers were to be effective on 1 January 2017. Demographic and financial projections related to foreign workers only are shown in Appendix 5.

These projections indicate that the ratio of the cost to the insured salary bill would increase from 0.75 per cent in 2016 to 0.79 per cent in 2017 and 0.81 per cent in 2018. In the long term the impact of extending coverage to foreign workers represents an increase in the cost ratio of about 4 basis points. This small increase results from the combination of the cost ratio for SOCSO insured and non-Malaysian workers. Over the projection period, the pattern of the ratio would be similar to the pattern in the absence of extension. Taken alone, the cost ratio for non-Malaysian workers is higher than for SOCSO insured workers by 30 basis points in the long term. The impact of the extension as measured by the ratio of benefit cost to insurable earnings is illustrated in figure 6.16.

In order to assess the impact on the contribution, the administrative expenditure must be considered. For the purpose of this valuation, it is considered reasonable to assume that the extra cost related to operations would be proportional to the increase in the volume of business. Therefore the ratio of administrative expenditure to insurable earnings, which is 0.15 per cent in the first projection years, can be used to assess the contribution rate. The required contribution rate would be 0.94 per cent in 2017 and would tend to decrease.

Table 6.18 Key assumptions underlying the projections of extension of EI coverage to foreign workers

Assumptions	Description
Covered population	The covered population is based on the non-Malaysian population in 2014 of the 2014 Labour Force Survey. It is projected to increase at the rate of 0.1 per cent per year based on the assumptions made by the Department of Statistics in its projection of the population.
Earnings	The distribution of earnings of SOCSO insured has been adjusted to target the average earnings of non-Malaysian workers in the Labour Force Survey.
Incidence rates	The following coefficients have been applied to the incidence rates used for the base scenario: Temporary disablement: 1.24 Permanent disablement: 1.17 Proportion of work-related deaths: 1.39 They correspond to the average of the last two lines in table 6.16.
Other	All other assumptions such as density, family composition, duration of temporary disablement, average percentage of permanent disablement and so forth, are the same as those of the base scenario.

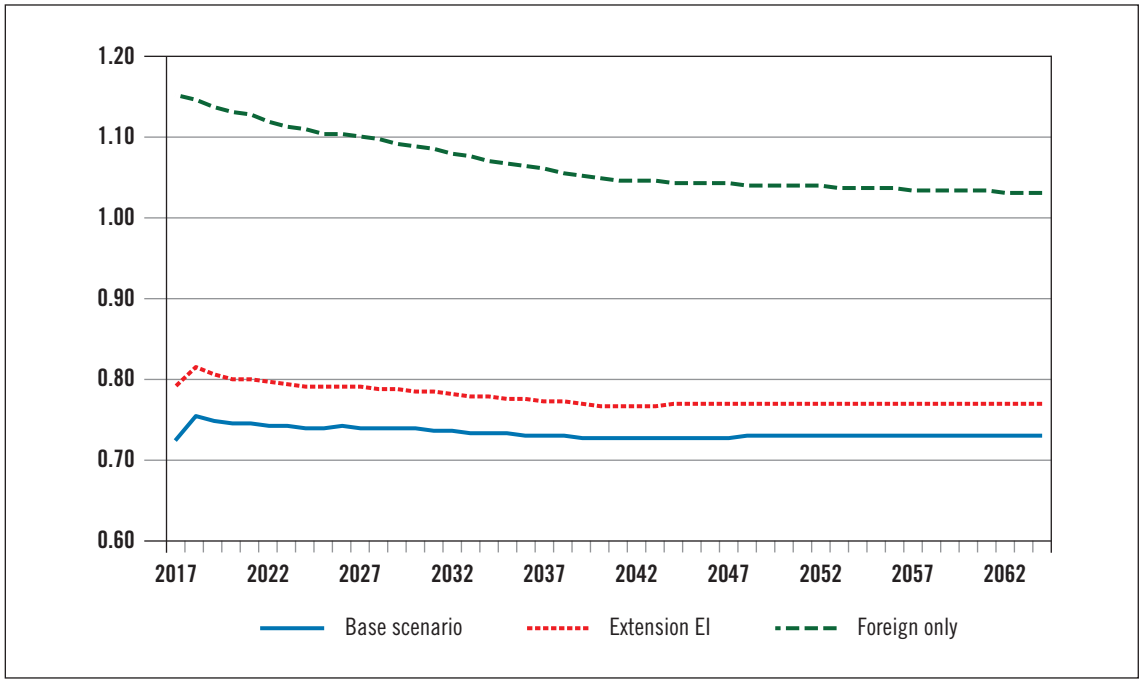
Table 6.19 Financial projections, Employment Injury Benefits branch, extension of coverage, 2014–64 (MYR millions, costs reported according to the funding method)

Year	Insured salary bill	PD pensions	PD lump sums	Dependants		Funeral grants	TD	Other[1]	Total	Total as % of insured salary bill
				Widow (ers)	Orphans and parents					
2014	117 836	106	345	172	103	2	167	44	939	0.80
2015	128 698	117	368	185	114	2	181	48	1 015	0.79
2016	150 720	127	412	199	121	2	211	53	1 124	0.75
2017	211 021	195	592	302	183	3	315	78	1 669	0.79
2018	230 883	226	670	348	205	3	342	86	1 880	0.81
2019	252 579	246	731	375	218	4	373	93	2 039	0.81
2020	276 273	268	798	403	232	4	406	102	2 213	0.80
2021	299 422	292	869	434	247	4	439	110	2 396	0.80
2022	324 044	316	941	465	262	4	475	119	2 583	0.80
2023	350 174	342	1 019	497	277	5	513	129	2 782	0.79
2024	377 793	370	1 101	531	292	5	554	139	2 993	0.79
2029	521 513	518	1 542	708	369	6	770	193	4 106	0.79
2034	691 396	693	2 056	894	444	8	1 031	257	5 383	0.78
2039	900 178	910	2 687	1 107	533	10	1 353	335	6 935	0.77
2044	1 163 010	1 181	3 469	1 416	666	12	1 760	434	8 940	0.77
2054	1 915 484	1 955	5 713	2 359	1 055	20	2 924	716	14 742	0.77
2064	3 112 737	3 201	9 323	3 852	1 652	33	4 793	1 165	24 019	0.77

Notes: The cost of PD pensions and dependents benefits is the present value of pensions awarded during the year. For all other benefits, the cost is the payments made during the year.

[1] Includes medical benefits, physical and vocational rehabilitation, constant attendance allowances, activities promoting safety and health, penalties written off and general expenditure not elsewhere classified.

Figure 6.16 Extension of coverage to foreign workers, ratio of benefit cost to insurable earnings (percentage)



Delivery of benefits

Financial considerations are not the only element to consider in the assessment of the impact of the extension to foreign workers. The feasibility of delivering proper services at a reasonable cost must be carefully scrutinized.

The delivery of medical care and physical rehabilitation services during the recovery period following the occurrence of injury also requires special attention, as the support of relatives so important in acute conditions may not be available. It is understood that SOCSO has had to deal with such situations in the past and is aware of measures to be taken in those circumstances to overcome problems.

The delivery of medical and allied care as well as periodical payments for a long period requires the maintenance of contacts with the benefit recipients, which is a challenge when they do not reside in the country of the administrative agency. It has been mentioned that the follow-up regarding the survival of pensioners was a major reason to transfer the coverage of foreign workers under the Workmen's Compensation Act which provides lump sums in case of permanent disablement and death.

There are different ways of overcoming the difficulties related to administration of periodical payments. One of them is to determine the value of periodical payments awarded to benefit recipients and pay lump sums. An alternative consists in making agreements with the social security agencies of the country of the foreign worker: periodical benefits would be paid by the country of origin of the injured workers when they are back in their country, or to their survivors. This solution has its limitations, as it would be utopian to make arrangements with all countries of foreign workers. Nevertheless, since close to 75 per cent of foreign workers come from three countries, namely Bangladesh, Indonesia and Nepal, this approach may have some appeal. However, the Bangladesh and Nepal EI schemes are still in the developmental phase and may not yet have the capacity to administer international agreements. Practically, Indonesia is the only country with which an agreement could be envisaged in the short term.

In terms of equality of treatment between foreign and national workers, a single public administering agency is a good way to ensure uniformity in policies and administrative practices. Besides, due

to ready access to accident records such an agency is in a very good position to develop prevention programmes to support the improvement of work conditions.

Conclusion

Despite limitations of the available data regarding the frequency and severity of injuries, it is possible to estimate with a reasonable degree of confidence that the current rate of 1.25 per cent would be sufficient to cover the cost of the EI scheme in the event of extension of coverage to foreign workers. The extension would require adjustments and innovation in the delivery of services. SOCSO should carefully analyse the impact of the extension on its operations and identify how recent technological advancements can be applied to improve the quality of services at the lowest cost possible. A country relying on foreign human resources to support its economic development should apply decent work conditions for all.

6.4 24-HOUR COVERAGE OF ACCIDENTS UNDER THE EI SCHEME

SOCSO is contemplating the possibility of providing benefits currently available under the EI scheme to insured workers for all causes of accidents, work-related or not. This improvement in the protection seems to find its origin in the difficulty of determining whether accidents are work-related or not in several situations The determination of the cause of accident is necessary to identify under which of the EI or the IS schemes workers can be compensated. This task is considered unproductive and stakeholders question whether its administrative cost could be avoided.

The protection of the EI scheme is more generous than the IS protection: coverage is available on day one of registration; allowances are paid in case of temporary disablement; permanent disablement benefits are available for any degree of impairment; and the replacement rate is more generous (90 per cent of reference wage for 100 per cent impairment). Employers agree with the principle of the coverage change so long as workers would contribute to the improved scheme in order to cover the additional cost. It should be said that the difference in generosity between employment injury benefits and invalidity benefits generally available as ancillary benefits in retirement pension systems often comes from the historical roots of the schemes that have their own objectives in term of social protection. It is legitimate and appropriate to examine the grounds for extending employment injury benefits to all causes of accidents. The international experience will be useful to this discussion.

Very few countries in the world through their social security legislation provide the package of benefits available in case of work-related injury (the package includes health care, physical and vocational rehabilitation, long-term disablement and death benefits) for other categories of injuries. Their experience will be briefly described with the aim of identifying useful guidance to assist Malaysia in its quest for efficiency in delivering social protection.

No-fault concept

An important distinction among the schemes providing protection for all accidents is whether or not the right to seek recovery through the civil justice system for losses from other parties is abolished. “No-fault” only means that compensation is available without having to prove the guilt of any party. It does not necessarily imply that a party having contributed to the occurrence of the contingency is not subject to being sued for compensating the injured person. The possibility of suing employers is non-existent in employment injury schemes. However, suing remains a possibility in some countries for the amounts above the ceiling of benefits provided by the social insurance scheme.

For other than work-related injuries, social risk insurance as a rationale of social security schemes has been so far more difficult to implement. When the number of motor vehicles increased in industrialized

countries during the decades following the First World War, compensation for motor-vehicle-related injuries began to be a problem similar to what had been experienced with work injury during the intensive industrialization period at the beginning of the century. According to civil laws applicable to the compensation of motor-vehicle-related injuries, persons injured in car accidents had to demonstrate the fault of a third party to get compensation. The proof was often difficult to make, the judicial process was costly and lengthy. Even in successful demonstration of fault, the owners of vehicles could be insolvent or have no liability insurance coverage. In such a system, injured persons deemed responsible, or who were unable to demonstrate the fault of another party, were left without compensation except in the very rare circumstances when they were covered by a first-party private insurance.

The idea of applying the concept of no-fault compensation was raised on the grounds that motor vehicle accidents had become a social risk. Motor vehicle accidents are considered unavoidable, despite the abilities and goodwill of drivers. Private companies started to offer no-fault benefits in addition to liability insurance to vehicle owners as a response to criticism of the liability system. In general, the ceiling of no-fault benefits remained low and the use of third-party liability remained predominant for the compensation of damages to persons. As insurers remained subrogated and could recover from third parties the no-fault benefits they paid to their insured, this system continued to generate high litigation costs and left several injured persons without adequate compensation. The subrogation and the right to seek recovery from a third party were in general not abolished because of the fear that its abandonment would generate irresponsible behaviour on the roads. Of course, lawyers advocated strongly against the concept of exclusive no-fault compensation for motor vehicle accidents. Despite the doubts and fears expressed by groups who were often perceived as protecting their self-interest, certain countries decided to provide the package of work-related injury benefits to motor vehicle injuries and to all types of accidents. The right to sue or subrogation has been fully abolished or strongly limited.

International experience

Table 6.20 presents a short description of three universal schemes providing no-fault coverage in case of non-work-related accidents through public agencies. For two of them accidents of all causes are covered, while in the third one, motor vehicles and certain specific types of accidents only are covered.

It is important to highlight that the financing of the three schemes is linked to the type of accidents. The rationale is that the compensation cost should be borne by those generating the risk. According to economic theory, this promotes optimal allocation of resources. For work-related accidents, the work activity is considered the risk generator and the cost is borne by employers according to the risk of their industry and the risk of their own enterprise when the statistical credibility makes it possible. Motor vehicle accidents are financed by road users, while the remaining hazards are financed by those who are exposed to risk or through general taxation if this is the best way to reach the exposed at risk, or if there is a need for subsidization because the exposed population at risk have no or few financial resources. Therefore, no country has so far adopted a comprehensive coverage of accidents on the grounds of avoiding the burden of determining their cause. It is considered more efficient to incur administrative costs for proper allocation of compensation costs in order to finance the schemes according to sound principles. Monitoring the cause of accidents and their cost is essential to develop proper prevention campaigns in order to reduce the risk and the cost of compensation. The ultimate target should be zero accidents for any cause.

Determining the cause of accidents for statistical purpose only would be less burdensome to SOCSO, as there would be no consequence on the benefits provided to injured persons for cases in grey areas that would otherwise require in-depth investigation. However, this does not mean that controversies would be fully eliminated; they would shift from the distinction between causes of accidents to the frontier between accident and disease. Indeed, some traumatic situations can be considered either as diseases or accidents (e.g. carpal tunnel syndrome).

Table 6.20 Public schemes with 24-hour protection against accidents

Country	Highlights
New Zealand	All citizens are covered against all categories of accidents. Benefits are financed through five funds depending on the type of accident and the status of the injured person. These funds are: **Earners' account:** non-work and non-motor vehicle accident injuries to workers, financed by levies paid by earners. **Work account:** work-related injuries, financed by contributions from employers and self-employed as percentage of insured earnings. **Motor vehicle account:** injuries involving moving motor vehicles, financed by motor vehicle owners through levies and by petrol users. **Non-earners account:** injuries to non-workers that are non-motor-vehicle related, financed by government appropriations from general taxation. **Treatment injury account:** injuries from medical treatment not associated with potential risk of treatment, financed from earners and taxes in proportion of costs. The administrative agency is the Accident Compensation Corporation. The system started in 1971 but has evolved over time. The current law was adopted in 2001. Emphasis is on rehabilitation, prompt and sustainable recovery and return to work where applicable. Full funding is applied except in the Non-Earners Account which is pay-as-you-go financed No right to sue and no subrogation.
Switzerland	**All employees** are covered for **all types of accidents**. Coverage of the self-employed is optional. Insurance is provided by SUVA, a public agency, in the primary and secondary sectors, while private insurers provide coverage to the tertiary sector. Work-related injuries are financed by employers' contributions while the non-work-related injuries are financed by employees' contributions. Subrogation exists. Insurers may recover benefits from third parties at fault.
Quebec (Canadian province)	**Work-related** injuries: employees are covered. Coverage of self-employed is optional. The scheme is financed through employers' contributions and administered by a public agency (CNESST, also in charge of safety and health and workplace inspection). **Motor-vehicle-related** injuries: all residents are covered. The scheme is financed through contributions from drivers and motor vehicle owners and is administered by a public agency (SAAQ, also involved in road safety and control). **Criminal actions:** residents are covered for personal damages resulting from criminal actions. The scheme is financed through general taxation and administered by a public agency (CNESST, that also administers work-injuries). Right to sue is abolished except for criminal actions.

Financial impact of 24-hour protection

At the time of completing this report, the data required to make an assessment of the financial impact of 24-hour protection for accidents within a narrow range of reasonable values were not available. However, it is possible to make a rough assessment useful to determine whether the range of possible values is acceptable, so as to justify undertaking detailed data gathering and processing.

Information available on the IS scheme compensations can be used to assess the financial impact of 24-hour protection. The cost of benefits paid under the IS scheme for non-work-related injuries can be determined so long as the statistics for the code of diseases are reliable. The compensation cost would be transferred from the IS to the EI scheme. This cost has to be adjusted upward to consider the difference in replacement rates and the package of benefits. Indeed, as the IS scheme currently provides benefits for disablement above 67 per cent only, an estimate has to be made on the additional number of injured persons who would receive benefits for disablement below 67 per cent and temporary disablement. This estimate can be achieved by using the experience of the EI scheme and assuming for preliminary estimate that cost ratios between categories of benefits in the EI scheme would hold for accidents of all causes. International experience can be useful in appraising the reasonableness of those estimates.

Table 6.21 presents data related to IS beneficiaries for which the code of diseases seems related to the occurrence of accidents which, by definition, would be non-work-related.

Table 6.21 Number of invalidity and survivors' cases reported due to injuries, and related codes, 2010–14

	Codes related to injuries							All codes
	37	38	39	40	41	42	Sub-total	
2014								
Invalidity	257	262	184	1	235	3	942	18 072
Survivors	17	98	12	32	547	86	792	12 033
2013								
Invalidity	282	134	188	3	172	10	789	17 552
Survivors	18	82	19	27	606	132	884	10 950
2012								
Invalidity	207	38	118	2	168	11	544	13 615
Survivors	7	90	14	41	519	190	861	9 174
2011								
Invalidity	128	55	149	5	116	7	460	12 814
Survivors	17	111	11	32	519	103	793	8 672
2010								
Invalidity	104	41	163	0	155	0	463	11 972
Survivors	51	96	22	36	469	82	756	8 167

Notes:
37 Fractures
38 Intracranial and internal injuries including nerves
39 Open wounds and injury to blood vessels
40 Poisoning and toxic effecats
41 Transport accidents
42 Suicide and self-inflicted injuries

Over the five-year period 2010–14, the proportion of accident-related cases among the beneficiaries of the IS scheme was 4 per cent for invalidity and 8 per cent for deaths. (These proportions are probably underestimated because they do not include a share of the number of occurrences in the code 44 "Other" which may also include accidents. Code 44 represents about 30 per cent of all cases.)

Transport accidents generated 27 per cent of invalidity cases and 65 per cent of survivors. In order to assess the impact on the EI, which is funded according to the terminal funding approach, the present value of the cost of awards for non-work-related accidents must be established.

Using the simplistic assumption that the distribution of IS injury cases by sex, age and salary is applicable for accident injuries of all causes, the ratio of the present value of accident-related benefits to the insurable wages is estimated at 0.12 per cent. Taking into account the higher replacement rates for pensions, the existence of benefits for permanent partial disablement and the temporary disablement under the EI scheme, the cost of non-work-related accidents would increase up to 1.27 per cent, based on the simplistic assumptions that certain relationships between categories of disabled for work-related injuries hold for all other causes of accidents. Table 6.22 presents the components of this increase. The net cost of the extension of coverage is estimated at 1.15 per cent of insurable earnings. The cost is determined according to the terminal funding method and represents the average cost rate over the 50-year projection period.

The assumptions used in each step are the following:

Replacement rate: It is assumed that the average replacement rate under the IS branch is 60 per cent and the average degree of disability above 67 per cent is 85 per cent. Given the replacement rate of

Table 6.22 Cost increase due to the benefits package (% of insured bill)

	Invalidity	Survivors	Other	Total increase	Cumulative increase
Cost under IS	0.05	0.06	0.00	0.12	0.12
Impact of change in benefit package					
Replacement rate	0.01	0.03		0.05	0.17
Disablement pension 20%–67%	0.15			0.15	0.32
Lump sum disablement	0.60			0.60	0.92
Temporary disablement	0.35			0.35	1.27
Medical benefits			0.00	0.00	1.27

Note: Totals may differ from the sum of elements because of rounding.

90 per cent for total disablement under the EI branch, in order to adjust the cost under the IS branch the replacement rate under the EI branch is multiplied by a coefficient equal to 1.275 (= 0.90 x 0.85 / 0.60) for disabled or to 1.50 (=0.90 / 0.60) for survivors.

Disablement pension 20%-67%: This component corresponds to the cost of benefits awarded to injured workers with a degree of disablement ranging from 20 to 67 per cent (not currently available under the IS branch). It is obtained by multiplying the cost of injured workers with a degree of disablement above 67 per cent (0.05% + 0.01%) by a coefficient of 2.27 (=(0.85 x 0.34)/(0.15 x 0.85)).The adjustment coefficient is obtained by relating the cost of benefits for this set of beneficiaries to the cost of injured workers with a degree of disablement above 67 per cent. The coefficient value takes into account the proportion of beneficiaries and the average degree of disability in each category of disablement.

Lump sum disablement: This component corresponds to the cost of benefits awarded to injured workers with a degree of disablement below 20 per cent. The adjustment coefficient is obtained by relating the cost of benefits for this set of beneficiaries to the cost of injured workers with a degree of disablement above (From MH: OK? not 'below'?) 20 per cent. It is equal to the average ratio of 2.76, which takes into account the age and sex distribution of disablement benefits. The cost increase in percentage is estimated as follows: (0.05+0.01+0.15) x 2.76=0.60.

Temporary disablement: This component corresponds to the cost of benefits paid for short-term disablement. The adjustment coefficient is obtained by relating the cost of those benefits to the pension awards. The average ratio is 0.94. It takes into account the sex-distinct level of benefits and pensions. The cost increase in percentage is estimated as follows: (0.05+0.01+0.15) x 1.61=0.35.

Medical benefits: The adjustment is not material and was assessed by considering the relationship between the cost of medical benefits and other benefits in the EI branch.

Comparing the estimated cost of other-than-work-related injuries at 1.27 per cent to that of work-related injuries (0.73 per cent), we obtain a ratio of 1.73. This means that non-work-related injuries to workers would be more costly than work-related injuries. The estimate is very sensitive to the number of accident-related permanent disablement cases under the IS branch. For example, if the basic assumption that 4 per cent of IS invalidity pensions are non-work-related accidents is changed to 3 or 5 per cent, the estimated cost of non-work-related accidents would be 0.97 per cent or 1.56 per cent. The cost is also sensitive to the number of deaths, but this only affects survivors' benefits and thus an estimation error does not have a leverage impact as material as for disablement.

It is interesting to assess the reasonableness of this estimation through the analysis of certain data for Malaysia regarding transport accidents and the international experience.

Data on other than work-related accidents in Malaysia

Table 6.23 presents general data on traffic accidents in Malaysia, which represent a material proportion of non-work-related accidents in the SOCSO IS branch.

Highlights of table 6.23 are the following:

- The number of registered vehicles has increased by 137 per cent and the number of accidents has followed a similar pattern with an increase of 90 per cent from 2000 to 2014.
- The number of deaths has increased slightly (11 per cent) while the number of injuries (both bad or heavy and light) has decreased sharply.
- The indices of fatalities suggest a relative improvement in the road traffic record.

Clarification on reporting methods of injuries is needed before concluding on the improvement of the road traffic record, as the decline of injuries compared to the increase in the death record raises questions. Unfortunately, there is no detailed information on deaths and injuries that would allow an assessment of the number of those involved in road traffic accidents who could be eligible to IS benefits. Nevertheless, it is interesting to observe that the number of badly injured is lower than the number of deaths in table 6.23, as the same pattern is also observed in table 6.21. There is some general consistency between the sets of data.

In table 6.23, the ratio of light injuries to heavy injuries fluctuates between 1.75 and 4.19 during the period. We do not know the definition of bad (heavy) and light injuries, but this observation in any case indicates that the pattern of injuries in traffic accidents can be different from that in work accidents. The assumptions used for the determination of the number of disabled with low disablement percentages (below 67 per cent, which includes both pensions and lump sums) could overestimate the cost.

Table 6.23 General data on traffic accidents in Malaysia, 2000–2014

Year	Registered vehicles	Population	Number of accidents	Deaths	Badly injured	Light injury	Deaths index per 10,000 vehicles	Deaths index per 100,000 persons	Deaths index per billion km travelled
2000	10 598 804	23 263 600	250 429	6 035	9 790	34 375	5.69	26.00	26.25
2001	11 302 545	23 795 300	265 175	5 849	8 680	35 944	5.17	25.10	23.93
2002	12 068 144	24 526 500	279 711	5 891	8 425	35 236	4.90	25.30	22.71
2003	12 819 248	25 048 300	298 653	6 286	9 040	37 415	4.90	25.10	22.77
2004	13 828 889	25 580 000	326 815	6 228	9 218	38 645	4.52	24.30	21.10
2005	15 026 660	26 130 000	328 264	6 200	9 395	31 417	4.18	23.70	19.58
2006	15 790 732	26 640 000	341 252	6 287	9 253	19 885	3.98	23.60	18.69
2007	16 813 943	27 170 000	363 319	6 282	9 273	18 444	3.74	23.10	17.60
2008	17 971 901	27 730 000	373 071	6 527	8 868	16 879	3.63	23.50	17.65
2009	19 016 782	28 310 000	397 330	6 745	8 849	15 823	3.55	23.80	17.27
2010	20 188 565	28 910 000	414 421	6 872	7 781	13 616	3.40	23.80	16.21
2011	21 401 269	29 000 000	449 040	6 877	6 328	12 365	3.21	23.70	14.68
2012	22 702 221	29 300 000	462 423	6 917	5 868	11 654	3.05	23.60	13.35
2013	23 819 256	29 947 600	477 204	6 915	4 597	8 388	2.90	23.10	12.19
2014	25 101 192	30 300 000	476 196	6 674	4 432	8 598	2.66	22.00	10.64

Table 6.24 Road traffic fatalities, international data from selected countries

Country	Reported road traffic fatalities (2013)	WHO estimated road traffic fatalities	WHO estimated rate per 100 000 population
Malaysia	6 915	7 129 (95% CI 6 050–8 209)	24.0
Canada	2 077	2 114	6.0
Indonesia	26 419	38 279 (95% CI 32 079–44 479)	15.3
Korea (Republic of)	5 092	5 931	12.0
New Zealand	253	272	6.0
Switzerland	269	269	3.3
Thailand	14 059	24 237	36.2
Viet Nam	9 156	22 419	24.5

Source : World Health Organization, *Global Status Report on Health Safety 2015.*

Though the Malaysian road accident record seems to have relatively improved at the beginning the 21st century, it is interesting to compare it to that of other countries, especially those offering 24-hour accident coverage. Table 6.24 presents data for countries with public compensation schemes covering non-work-related accidents, as well as for selected countries in Asia.

The range of road fatalities per 100,000 population is wide. Though this indicator has its limits (as the compensation costs of fatalities in road traffic accidents may be lower than the costs of disablement), it is useful to assess the comparative level of the cost of compensation of road traffic accidents to that of work injuries. It can be expected that the cost of non-work-related injuries would be higher in Malaysia than in the three countries having a public compensation scheme. Finally, it can be observed that the improvement in the Malaysia index of road fatalities per 100,000 population has been modest and that a lot can still be done to improve the situation.

Road traffic accidents are not the only cause of non-work-related accidents, but available data on accidents are very limited. Table 6.25 presents data on causes drawn from the discharge records of Ministry of Health hospitals for the period under consideration.

First, it must be said that the data can include work-related accidents. The number of discharges for causes other than transport accidents is larger than for transport accidents, which seems consistent with the profile of non-work-related injured in IS branch (table 6.21). The number of transport accidents is larger than the number of injuries reported in table 6.23 for road traffic accidents (data from the Ministry of Transport). More information is required from both sources to reconcile the differences and use the proper set of data with confidence.

Table 6.26 presents the same type of information for accidental deaths.

Again, it must be said that the data can include work-related accidents. The number of fatalities is much lower than reported in the Ministry of Transport (MOT) statistics (the Ministry of Health (MOH) number represents only 12 per cent of the MOT number). This relation is reversed for non-fatal cases, with MOH reporting much higher numbers than MOT.

The Department of Statistics in Malaysia probably has relevant information on the causes of deaths, but such information is not available on its website. It is recommended to work in close collaboration with that institution to complete a cost estimation based on reliable data.

Table 6.25 Causes of accidents, by discharges from Ministry of Health hospitals, 2011–14

Discharges	Number				Rate per 100 000 population			
	2011	2012	2013	2014	2011	2012	2013	2014
Transport accidents								
Motorcycle rider injured in transport accident	22 361	8 115	12 552	15 336	77	28	42	51
Car occupant injured in transport accident	2 955	1 124	1 779	1 786	10	4	6	6
Other land transport accidents	47 392	18 231	27 358	28 844	164	62	92	96
Other (9 codes)	3 837	1 490	1 760	2 169	13	5	6	7
Total	**76 545**	**28 960**	**43 449**	**48 135**	**264**	**99**	**146**	**160**
Causes other than transport accidents								
Falls	29 319	10 244	16 366	20 371	101	35	55	68
Exposure to inanimate mechanical forces	13 816	4 565	6 999	8 957	48	16	24	30
Contact with venomous animals and plants	7 397	3 410	4 348	4 926	26	12	15	16
Accidental poisoning by and exposure to noxious substances	5 198	2 055	2 938	3 682	18	7	10	12
Accidental exposure to other and unspecified factors	29 368	19 050	26 742	38 453	101	65	90	128
Other (7 codes)	7 288	3 188	4 375	5 116	25	11	15	17
Total	**92 386**	**42 512**	**61 768**	**81 505**	**319**	**145**	**208**	**271**

Table 6.26 Deaths from accidental causes, Ministry of Health hospitals, 2011–14

Deaths	Number				Rate per 100 000 population			
	2011	2012	2013	2014	2011	2012	2013	2014
Transport accidents								
Motorcycle rider injured in transport accident	242	94	139	193	0.84	0.32	0.47	0.64
Car occupant injured in transport accident	48	21	36	45	0.17	0.07	0.12	0.15
Other land transport accidents	923	329	453	585	3.19	1.12	1.52	1.94
Other (9 codes)	76	25	28	40	0.26	0.08	0.09	0.13
Total	**1 289**	**469**	**656**	**863**	**4.46**	**1.59**	**2.20**	**2.86**
Causes other than transport accidents								
Falls	209	78	154	220	0.72	0.27	0.52	0.73
Exposure to smoke, fire and flames	45	22	26	38	0.16	0.07	0.09	0.13
Accidental poisoning by and exposure to noxious substances	69	33	51	73	0.24	0.11	0.17	0.24
Accidental exposure to other and unspecified factors	422	333	341	613	1.46	1.14	1.15	2.04
Other (8 codes)	77	33	42	51	0.25	0.1	0.12	0.16
Total	**822**	**499**	**614**	**995**	**2.83**	**1.69**	**2.05**	**3.3**

International experience on accident compensation schemes

Among the three existing public schemes with compensation for non-work-related accidents (table 6.20), Switzerland's scheme is probably the closest to what is contemplated by Malaysia for its 24-hour coverage. It protects all employees on a mandatory basis and unemployed workers are considered part of the labour market. The cost of work-related accidents and non-work-related accidents are monitored separately, which provides an interesting benchmark. Table 6.27 presents compensation costs observed during the period 2008–12 separately for the work-related and the non-work-related schemes.

Table 6.27 allows some useful analysis. The total cost of non-work-related injuries is 1.86 times that of work-related injuries, but the ratio varies significantly by category of benefits. The cost structure of non-work-related accidents seems different than that of work-related ones. As the medical treatment costs for work-related accidents in the Malaysia EI branch represent a smaller proportion of the total cost than the equivalent in the Swiss scheme, the ratio of the cost of non-work related injuries to that of work injuries (excluding medical and allied care) may be a more relevant benchmark. This ratio is still high at 1.57. Both ratios are fairly close to the estimation made with the Malaysian experience.

Another interesting element in the Swiss data is the weight of transport accidents in the non-work-related injuries.

Table 6.27 Compensation costs in Switzerland, 2008–12 (CHF '000)

	Medical and allied services	Temporary disablement	Permanent disablement	Survivors	Total
Work-related injuries					
2008	415 300	569 353	362 267	80 787	1 427 707
2009	421 227	587 471	317 295	73 757	1 399 750
2010	427 721	596 866	301 888	69 064	1 395 539
2011	437 708	615 808	278 992	68 062	1 400 570
2012	456 749	647 153	272 739	60 689	1 437 330
Non work-related injuries					
2008	1 034 613	964 515	562 597	92 695	2 654 420
2009	1 081 528	1 027 977	479 779	92 529	2 681 813
2010	1 061 133	992 652	439 992	108 138	2 601 915
2011	1 088 544	1 012 608	365 936	96 683	2 563 771
2012	1 121 304	1 041 709	345 412	90 212	2 598 637
Ratio non-work-related/work-related 2008-12					
	2.50	1.67	1.43	1.36	1.86

Source: SUVA: *Statistiques des accidents LAA 2008—012*, 2014, table 1.3.

Table 6.28 Switzerland: Statistics related to non-work-related transport injuries, 2008–12

Category (transport-related)	Percentage of non-work-related accidents %
Total number of cases	11.0
Severe cases	21.2
Deaths	43.1
Disablement pensions	37.0
Cost	27.1

Table 6.29 New Zealand: Accident compensation incurred claims cost, 2013 (NZD millions)

Type of expense	Motor vehicle account	Work account	Earners' a ccount	Non-earners' account	Treatment injury account	Total
Medical costs	59.6	110.2	338.8	24.5	506.9	1 040.0
Elective surgery	30.8	55.2	181.0	65.9	78.2	411.1
Social rehabilitation	205.8	34.3	104.9	127.3	187.4	659.6
Compensation related	114.2	296.6	451.8	62.3	14.3	939.2
Other	33.3	43.7	33.6	16.1	25.1	151.9
Claims handling expenses	31.7	63.4	126.5	18.3	77.5	317.4
Total	**475.3**	**603.3**	**1,236.6**	**314.4**	**889.4**	**3 519.1**

Severe cases include temporary disablement above 90 days in addition to deaths and disablement pensions. Among non-work-related injuries, transport injuries are more severe than injuries of other causes. Though the road traffic accidents record in Switzerland is good, the transport accidents still represent a high proportion of non-work-related accidents and cost.

The New Zealand accident compensation scheme is the most comprehensive of the three schemes presented in table 6.20, as it covers all accidents. Table 6.29 presents expenditure for the accident year ending 30 June 2013. Financial performance is examined on an "incurred" basis, which is consistent with the full funding requirements of the scheme. The consequence of this presentation is that claims incurred reflect the full estimated lifetime cost of new claims reported during the year, including the administrative expenditure to handle claims.

The first three accounts are of interest for our purpose. It is important to bear in mind that only part of the cost of motor vehicle accidents is related to workers while they are not at work. Commuting accidents are related to the work account only when transport is provided by the employer. In other circumstances, they are considered motor vehicle accidents. The highlights of table 6.29 are the following:

(1) The compensation cost of motor vehicle accidents for all residents is lower than that of work-related accidents.

(2) For causes of accidents other than motor vehicle and work-related (earners' account), the cost is twice that of work-related accidents.

The rules defining commuting accidents to be compensated by the work account in New Zealand are different from those of the Malaysia EI branch. The former involves a very small number of commuting accidentsm while almost half the accidents of the latter are commuting related.

The ratio of the cost of the earner'' account to the cost of the work account in New Zealand is about 2 (1,236.6/603.3=2.04). If this relation holds in Malaysia, the cost of non-motor-vehicle injuries and non-work-related injuries would be twice the cost of work-related injuries, excluding the commuting accidents (industrial accidents). Based on the number of commuting accidents in Malaysia, the cost of industrial accidents is about 50 per cent of the cost of the EI branch. In consequence, the cost of non-motor-vehicle and non-work-related accidents in Malaysia would be about the cost of the EI branch (2 x 0.50=1).

Considering the cost of motor vehicle accidents that are not work-related as a multiple of the current EI cost to be added to this estimate of 1, the New Zealand observations corroborate the cost of covering all accidents in Malaysia, as deduced from table 6.22 data (1.73 times the current EI cost). Thus the ratio of the compensation cost of non-work-related accidents to the cost of work-related accidents would be higher than 1 and could be between 1 and 1.50 according to international experience.

Table 6.30 Quebec: Compensation cost of motor vehicle and work-related injuries, 2012–14 (CAD millions)

Scheme	2012	2013	2014
Motor vehicle	788.4	758.6	788.4
Work	1 561.1	1 667.7	1 664.3
Ratio work/motor vehicle	1.98	2.20	2.11

The experience of the **Quebec** system is of limited use as it covers only motor vehicle injuries in addition to work injuries. However, its experience is interesting as the ratio of the cost of work-related injuries to the cost of motor vehicle injuries is similar to that in New Zealand, as shown in table 6.30. There are interesting commonalities in the experience of the two systems. This may add a certain degree of confidence in the rough estimates performed so far.

Concluding remarks and recommendations

Extending the current protection of the EI scheme to all causes of accidents is an intention that has its merits. Very few countries have followed that path so far.

The concept of social risk and comprehensive compensation to persons having a motor vehicle accident is not new; it was analysed in the first part of the 20th century when the motor vehicle industry was developing. Its application has been limited because of the fear of its negative consequences on the behaviour of drivers, which may have been stimulated by actions of certain groups having an interest in the maintenance of the tort system. The experience of countries having put in place a "no-fault" compensation system has demonstrated that the fear of a negative impact on the motor vehicle accident record was not justified. Nonetheless, the questions of maintaining the right to sue for damages above the benefit limits of the social security system, and subrogation when a non-insured third party is considered at fault, have been addressed in different ways by countries.

Regarding the non-work and non-motor-vehicle accidents, the rationale behind their coverage has not been exhaustively elaborated. It could be related to a mix of social risk and pragmatic considerations. In any case, all parties, including employers, have an interest in having workers suffering accidents at home or during leisure activities to return to work promptly after receiving the appropriate medical and rehabilitation services.

Countries that have put in place extensive 24-hour coverage have adopted intensive prevention programmes targeting all categories of hazards. This is an essential condition for the well-being of the society. It is not sufficient to simply take care of victims after occurrence of accidents. The risk of their occurrence must be minimized as much as possible. In the matter of road transport, collaboration with the entities responsible for enforcement of rules, namely the police, is crucial. The ultimate objective should be zero accidents from any cause.

As administrator of the IS scheme, SOCSO probably has in hands a database that would enable it to make a reliable estimate of a component of the expected cost of 24-hour coverage. The number of IS beneficiaries and the additional compensation they would receive if they were covered by the EI branch could be assessed with better accuracy by conducting a statistically credible survey of existing files of beneficiaries. However, this would not be sufficient, as no data exist on the set of injured with permanent invalidity percentages lower than the threshold of 67 per cent that would enable them to receive a pension under the IS scheme, so these data would have to be estimated from other sources. The collaboration of the Ministry of Transport for transport accidents in particular and of the Ministry of Health for all causes would be necessary to better assess the frequency and severity of partial

permanent disablement. Despite the limitations of the present actuarial assessment, it has provided a valuable indication of the range of values for the cost of the 24-hour protection for all non-work-related accidents.

Though it is legitimate for SOCSO to take the initiative of analysing the potential improvement in the protection of insured under the scheme it administers, it should make sure that the political authorities are well aware of the significant societal consequences of the change and that they agree with the dedication of resources to an exhaustive feasibility study. An extension of coverage should be accompanied by an increase in the matter of prevention and possibly power to enforce rules.

Finally, should foreign workers become eligible to the EI scheme, the question as to whether they should be eligible to the full package of an eventual 24-hour coverage scheme will have to be addressed.

6.5 MEASURES TO DEAL WITH THE FINANCIAL SITUATION

Section 5 has analysed various measures dealing with the financial situation. They included the following two recommendations that apply whatever scenario regarding the contribution rate is applied:

(1) Allocate the investment income by branch according to the size of funds at the beginning of the year;

(2) Allocate 80 per cent (or an alternative percentage that would be determined after detailed analysis) of the administrative expenditures by branch according to the benefit payments and the rest (20 per cent) according to the insurable earnings (or equally for sake of simplicity).

A few scenarios regarding the contribution rate in both branches and the treatment of the free reserve in the EI scheme have been examined in Section 5 with a view to have a comprehensive understanding of possible actions before considering changes in the scheme. All scenarios considered the need to increase the contribution rate of the IS branch. Sections 6.1 to 6.4 have covered several matters in both branches of varying financial importance, but two of them, namely the extension of coverage of the EI scheme to foreign workers and the 24-hour coverage of accidents, should be given special attention in the financial planning.

Decisions regarding the increase in the contribution rate of the IS branch will have an impact on actions that can be taken in the management of assets. SOCSO is expected to take measures to reinforce its investment activities with the objective of achieving the best balance between expected return and risk. Uncertainty or significant variations in the amount of assets available may make this task more arduous. Efficiency suggests the adoption of a clear strategic plan in the funding of both branches which could be applicable over the mid-term.

As additional studies are needed to assess the cost of the 24-hour coverage more accurately and its impact on the social protection system in Malaysia, it seems pertinent to identify the financial actions to be taken without giving undue importance to this contemplated change. Uncertainty about this project should not prevent actions being taken where needed. Another reason for not giving prime importance to this project is the fact that governance principles suggest that the funding of the enhanced protection should stand on its own except for any start-up non-recurrent administrative costs.

The extension of coverage to foreign workers would have an impact on the financial evolution of the EI scheme, but not significant enough to change the outlook of its financial evolution. Therefore, the recommendations hold whatever happens with respect to this possible extension, which the ILO recommends to go forward with.

Any change in the contribution rate of the EI branch would raise the question of the cost sharing between employers and workers. Should a decrease in the contribution rate of the EI branch be allocated to increase the contribution rate of the IS branch, the current equality in the financing of the

IS system (by employers and workers) would be broken. Employers might feel it legitimate to request an increase in the contribution rate of workers at the same time. Workers might not easily accept that they have to bear an increase without any benefit improvement while the employers are not hit by any increase in contribution rate. This is a political issue that may be resolved through appropriate social dialogue. In any event, the ILO does not believe the time has come to make any change to the contribution rate of the EI branch. There is still uncertainty in the costs trend, and a decrease, which should be some rounded percentage such as 0.25 per cent, would be premature and imprudent. A decrease in the contribution rate should not be contemplated without thorough analysis of adequacy of protection under the EI branch, especially regarding medical care, which seems unusually low. It is better to keep this system well on track and face the financial problem where it is, in the IS branch.

However, a debate may be unavoidable. The ILO believes it is time to rearrange the allocation of reserves between branches, as the level of the free reserve in the EI branch, which was exclusively financed by employers' contributions, is no longer justifiable. There are good reasons to support the transfer of this free reserve to the IS branch, but this would not solve the financing problem SOCSO is facing with the decrease of assets. Employers might argue that this free reserve has been accumulated uniquely from their contributions and disagree with an increase in the contribution rate on top of this transfer. It may not be easy for workers to accept that the free reserve has been accumulated uniquely from employers' contributions, as it can be argued that in any case the take-home pay of workers was reduced by the contribution for the EI branch. Social dialogue will be essential to clarify this political issue.

The ILO recommends an increase in the contribution rate of 0.50 per cent, distributed evenly among employers and workers in 2018. According to the analysis of Section 5, another rate increase will be necessary in the IS branch by 2025 in order to avoid a decrease in assets. The next actuarial valuation, probably as of 31 December 2018, will provide updated guidance as to when the increase in the IS contribution rate beyond 2018 should be scheduled. In the meantime, a funding policy should be designed in order to guide the future rate increase of the IS branch until its cost stabilizes at full maturity. Three criteria have been analysed regarding the rationale of a funding policy for the IS branch:

(1) Variations in the contribution rate are guided by the objective of avoiding a decrease in assets.

(2) Variations in the contribution rate are guided by the objective of maintaining the ratio of assets over benefits expenditures above a given target.

(3) Variations in the contribution rate are guided by the objective of maintaining the assets above a given target percentage of the technical reserve (corresponding to the liabilities of pensions in payment).

The ILO recommends the selection of either option 2 or 3. Option 2 is common in the financing of scaled premium systems. Option 3 would have the advantage of better transparency in the disclosure of costs, as the accrued liabilities of pensions in payment would be highlighted. In any case, the ILO recommends that the liabilities of pensions in payment should be discloses in the notes to the financial statements.

We have mentioned earlier that employers could raise arguments against the transfer of the free reserve of the EI branch to the IS branch. A temporary alternative is thinkable. It would consist in freezing the free reserve of the EI branch while studies regarding the 24-hour protection are finalized, which can take up to two or three years. The free reserve could then be used totally or partially to subsidize the new scheme at its onset if a positive decision about its creation is made. This approach has some flaws, because stakeholders may be tempted to implement a scheme on the basis of a partial free ride in the first year of implementation. In the event that the project is abandoned, a decision regarding the transfer of the free reserve to the IS branch should be made.

Another option could be to immediately transfer a proportion of the free reserve to the IS branch and use the remaining proportion to temporarily reduce the contribution rate of employers in the EI branch.

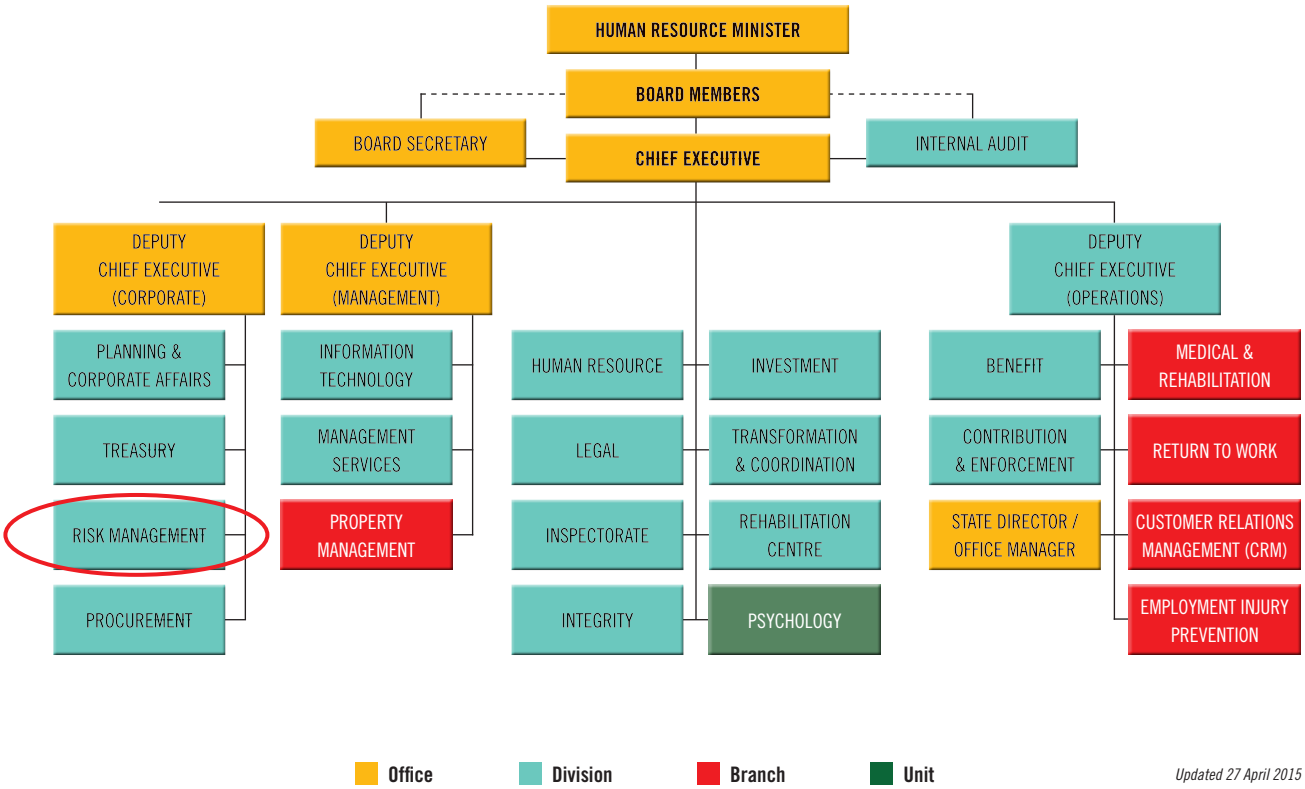
This would alleviate the impact on employers of the increase in the contribution rate in the IS branch. The rationale for this approach is to recognize that the arguments of both parties in the accumulation of the free reserve are sound and that equity can be achieved through a compromise acceptable to all.

6.6 DEVELOPMENT OF IN-HOUSE ACTUARIAL AND STATISTICAL CAPABILITIES

SOCSO has asked ILO to make recommendations for further development of in-house actuarial and statistical capabilities. Figure 6.17 presents the SOCSO organization structure. The Actuarial and Statistical Branch is under the Risk Management Division, alongside the Risk Assessment Branch and the Research and Social Security Development Branch. The staff of the Actuarial and Statistical Branch is composed of three members and led by Dr Ponniah Raman. During the conduct of the present actuarial valuation, the actuarial and statistic staff have played a key role in collecting SOCSO data and coordinating data collection from other institutions. The staff members have demonstrated a good understanding of the statistics they produced for the actuarial review. As the unit has been producing the annual statistical report, the staff is familiar with the scheme's provisions and core statistical data generally published by social security schemes. However, the work methodology in the data extraction and the validation process of actuarial data could not be observed, which limits our capacity to identify areas for improvement. It was also obvious that the capacity to produce certain refined data analyses was limited by the lack of availability of raw data.

The development of staff capabilities must be geared to the responsibilities given to their administrative unit. In order to formulate specific recommendations for further development of capabilities of SOCSO actuarial and statistical staff, their responsibilities must be analysed and their current capacities assessed. For the time being, this section presents below an overview of the role of actuaries and the organization of actuarial services within a social insurance organization, together with comments regarding training activities for capacity building.

Figure 6.17 SOCSO organization structure



Role of statisticians in social security institutions

The key responsibilities of statisticians consist in collecting, compiling and disseminating information related to the missions of the social security institutions on the insured and beneficiary population. Basically, they perform technical functions such as computer programming and report preparation, and interface with data users. Depending on the structure of the organization, they may have to conduct analyses and research studies or collaborate with the research staff in the data processing required by the studies. The main skills of statisticians sought by social security institutions are: mastery of statistical concepts, ability to design the content of a database responding to the need of the data user, ability to use IT statistical packages for data processing, and ability to analyse and interpret data and communicate findings orally and verbally.

It has not been possible to conduct a formal assessment of the strength and weaknesses of the SOCSO statisticians regarding the skills mentioned above. It seems that the delivery of periodical outputs such as the annual statistical report responds to expectations. As the information technology systems should evolve over time, the data gathering and processing may have to adapt to changes. Modernization of operational systems is a good opportunity to improve the database needed for the production of statistical data for internal and external use. Statisticians should be given the opportunity to maintain and enhance their expertise in the matter of the database through exposure to international best practice. This can be achieved by attendance at specialized seminars or technical visits to institutions.

Role of actuaries in social security institutions

Actuaries are experts in quantitative methods applied to the measurement of uncertain events. Their educational background includes basic to intermediate knowledge in many areas of expertise required in the management of insurance systems. They interact with other experts and it is important to define the scope and limits of their responsibilities in reviews of actuarial systems.

The central role of the actuary in the social governance of social security consists in performing the duties required by the legislation, if any, and providing the quantitative information required for the governance of the scheme. It is generally recognized that the actuary can bring a material contribution in:

- alerting the Government and governors of social security schemes to any inconsistencies and incompatibilities in the social, economic and tax policies;
- indicating any excessively optimistic financing or underfunding, protection inadequacy, misallocation of resources and risks for government future budgets; and
- acting as guardian of the financial rationality in the development of social policies.

In order to accomplish these tasks, the actuary needs to develop or adapt an actuarial analysis model, which requires both appropriate academic background and practical experience. This implies establishing the inputs to the modelling process: the data describing the current situation of the scheme and the parametres for the benefit calculation, a set of demographic, economic, fiscal and social assumptions. The actuary needs to have complete and reliable data in order to check the plausibility of assumptions, and to assess the coherence and realism of the vision of the social and economic development that underlies the modelling assumptions. Actuaries should be involved in the determination of the data processing systems in order to ensure that they will be able to produce the data necessary for analysis in the most efficient manner.

Throughout the existence of a social security scheme (at introduction, in regular monitoring or at time of reform), the actuary plays a crucial role in the analysis of the financial situation and in recommending appropriate action to ensure the viability of the scheme. In order to identify the needs for the development of the in-house actuarial expertise, it is useful to consider the participation of the actuarial staff in those tasks.

Actuarial valuations supporting the **introduction of a new scheme** are demanding in terms of knowledge and experience, as the actuary has to provide advice on fundamental questions regarding the scope of coverage, the design of benefits, the cost estimates and the financing mechanism. These are high-level tasks requiring the involvement of experienced actuaries.

In-house actuarial staff are not expected to participate frequently in such high-level exercises, as by definition they are hired to work on the existing scheme. However, this may happen when an agency is asked to implement a new branch in social security. It does not seem appropriate to orient the development of the SOCSO actuarial staff for the completion of this kind of work, as it is not expected to occur frequently and, in any case, the expertise of an experienced actuary would be needed should it happen. Nevertheless, the staff is in a good position to provide technical support (data processing) for this task, and its participation in such type of work would be an opportunity to develop their high-level skills in the matter and become eventually key players in this kind of activity. The development of a 24-hour coverage of accidents can be assimilated to the implementation of a new branch.

The **periodic review of a social insurance scheme** is a tool for monitoring the financial aspects of the scheme and provides an opportunity to make adjustments quickly if experience deviates from what was projected. This concerns not so much the amounts projected as their variation from one review to the next. The present actuarial valuation is an example of this kind of task.

SOCSO staff appear now well experienced in providing the data required for the determination of assumptions. In the course of this actuarial valuation, data queries have been limited almost exclusively to aggregate data and it was not possible to identify the capacity to build a database of individual records that would make possible more refined analysis. Another important duty of actuaries in periodic reviews is to verify the link between the data required for analysis with the financial information in the annual reports. It was not possible to involve the SOCSO staff in this task during the current actuarial valuation.

At the time of writing this report, no training session has been held yet and it is not possible to assess the technical abilities of the staff in modelling. However, as they have attended a seminar in actuarial modelling of pension schemes at the ILO training centre in Turin, their academic background is probably adequate. The training sessions will be an opportunity to better assess the needs for further development in this area. The long-term target should be that the in-house actuarial staff would produce the demographic and financial projections, while an independent group of actuaries would perform a peer review. Achievement of this goal would require an increase in the size of the actuarial staff. A critical mass of staff with an actuarial background is required to ensure that all parts of actuarial valuations are properly completed within a reasonable timeframe.

In this valuation, it is recommended to determine the technical reserve every year by applying the actuarial factors to pensions in payment. We believe that this task can be achieved by the in-house actuarial staff except the part regarding the reconciliation of results between each year-end, for which supervision would be needed for a few years. Usually, this work is peer-reviewed by an independent actuary to reassure the stakeholders.

In a **reform process**, the intervention of the actuary depends on the nature and extent of the targeted reforms. Legal changes to an existing scheme usually aim at strengthening its long-term viability and concern the coverage of the scheme, the level of benefits or the funding arrangements. Comments regarding periodic reviews apply for this duty.

However, the government may consider a structural reform to change the mechanisms of economic security, which means completely redrafting the benefit provisions or adding new protections or savings mechanisms. Comments regarding the introduction of a scheme apply for this duty.

For the production of the annual budget of the social security institution, actuaries can be required to perform **short-term projections** of contributions, investment income, benefits and administrative

expenses. These differ from typical long-term projections of actuarial reviews in terms of methodology and assumptions refinement. The short-term projections are also used by the social security institution or by centralized government units for planning purposes. They can be useful to managers in identifying human resource needs and computing capacity for the processing of claims and the collection of contributions, or in estimating cash requirements considered in short-term investment strategies. For this exercise, the actuary needs to work closely with the economists, accountants and investment managers of the government or of the institution. This work requires knowledge in certain specific techniques in data analysis, as well as comprehensive understanding of external and internal factors influencing the in-flows and out-flows. Such skills are generally acquired through participation in projects and in specialized technical seminars to fill gaps in the academic background if needed.

In addition to the actuarial tasks mentioned above, the team of actuaries in a social insurance institution covers a wide range of **other functions** in support of the management of the social security scheme and of the minister responsible for social policy. They can be involved in informing the public on financial and social security matters, making recommendations on modifications contemplated for the scheme, producing statistical reports, developing performance indicators, and in negotiation and administration of social security conventions.

In-house actuarial expertise

Actuarial expertise can greatly contribute to improving the institution's governance and the pursuit of its mission. Continued strengthening of in-house actuarial expertise is encouraged. It is essential that the institution monitor its experience on a continuous and regular basis. As a good database is crucial for the actuarial analysis, a validation process for the detection of inconsistencies and appropriate corrections should be in place. Given that capacity building is a gradual and repetitive process, it is recommended that actuarial staff become a more integrated part of the institution's benefit administration structure. It would be easier in that way to influence the creation of more elaborate statistics for future actuarial studies. The actuarial staff are encouraged to invest efforts to increase their operating capacity with ILO valuation models and tools.

In order to perform their duties and responsibilities, actuaries in social security need specific skills and knowledge that they acquire throughout their education years and careers. The learning materials can be grouped into four areas: (i) principles and foundation of social security; (ii) actuarial techniques and methods; (iii) economic, legal and tax environment; and (iv) specialized knowledge.

Participation in actuarial organizations should be encouraged if the minimum requirements are met by the staff. The Actuarial Society of Malaysia is a full member of the International Actuarial Association. Membership may provide the opportunity to participate in relevant seminars and strengthen the understanding of the actuarial role, especially in compliance with actuarial standards of practice.

APPENDIX 1
DESCRIPTION OF THE EMPLOYEES' SOCIAL SECURITY SCHEME (AS ADOPTED FOR THE TENTH VALUATION)

This appendix provides a general overview of the key coverage, contribution and benefit provisions of the SOCSO scheme as of 31 December 2014, including certain modifications to be implemented beyond this date that are known at the time of performing the valuation.

Legislation

The Employees' Social Security Act, 1969 (as amended), providing employment injury and invalidity benefits. Coverage for invalidity benefits ceases on attainment of age 60.

Administering organization

The Social Security Organization, a body corporate under a director-general appointed by the Minister of Human Resources. The general direction and superintendence of the organization is vested in a tripartite Board.

Categories of employees covered

Since 1 June 2016 all employees who are Malaysian citizens or permanent residents are covered regardless of their level of earnings (previously coverage was voluntary for those earning more than MYR 3,000 per month when eligible for the first time). For determining contributions and benefits, the earnings are limited to a maximum of MYR 4,000 per month. Public sector employees are excluded from coverage, except temporary and contract employees who are liable under the Act effective from 1 June 2013. Immigrant workers were excluded from April 1993. Self-employed and domestic servants are also excluded.

Contribution provisions

Insured persons are classified into one of the wage classes for each of which an assumed wage is specified in Ringgit. Up until 1 June 2016 there were 34 wage classes with the 34th class including those earning more than MYR 2,900. Adjustment to the wage class system is expected further to the increase of maximum insurable earnings from RM3,000 to RM 4,000. Contributions for employment injury benefits represent 1.25 per cent of the assumed wage of the wage class, and are entirely at the

charge of the employer. Contributions for invalidity and survivors' benefits represent 1 per cent, and are shared equally between the employer and the employee.

Employment Injury Benefits

"Employment injury" covers both industrial injuries and occupational diseases, and includes commuting accidents. The qualifying condition for benefit is that of being in insurable employment at the relevant time.

"Medical benefit", provided to victims of employment injury, includes: medical consultations and home visits, outpatient treatment, pharmaceutical supplies, inpatient treatment and prosthetic appliances.

"Temporary disablement benefit" is paid in the event of certified incapacity for work arising out of an employment injury, subject to a waiting period of three days. The daily rate of benefit is 80 per cent of the reference wage – i.e. one-thirtieth of the average assumed monthly wage over the preceding six months – subject to a minimum of MYR 30 per day and to a maximum of MYR 78.67 per day. The benefit is payable for seven days a week until the temporary disablement ends.

"Permanent disablement benefit" is payable if permanent disablement, partial or total, results from an employment injury. The daily rate of total disablement benefit is 90 per cent of the reference wage, subject to a minimum of MYR 30 per day. The benefit rate for partial disablement is proportional to the degree of disablement. If the degree is 20 per cent or less, the benefit can be commuted into a lump sum; if the degree exceeds 20 per cent, one-fifth of the benefit can be commuted. A constant attendance allowance of MYR 500 per month is payable to total disablement pensioners.

"Dependants' benefit" is payable in the event of death arising out of an employment injury, to a widow or widower and orphans. The widow(er) receives three-fifths and the orphans two-fifths (raised to three-fifths in the absence of a widow(er)) of 90 per cent of the average assumed daily wage of the deceased. If there are no primary dependants, parents and grandparents (in the absence of parents) and siblings may claim the benefit (40 per cent for parents and grandparents, 30 per cent for siblings), subject to whole or partial dependence. Benefits for adults are generally payable for life; for orphans and siblings, until the age of 21 or until marriage before 21; for orphans, beyond age 21 until completion of the first university degree or if mentally retarded or physically handicapped.

"Funeral benefit" (MYR 1,500) on death as result of an employment injury or while receiving disablement benefit.

"Rehabilitation benefit", consisting of vocational and physical rehabilitation, is available to employees suffering permanent disablement.

Invalidity (and Survivors') Benefits

"Invalidity pension" is payable, subject to qualifying contribution conditions, in the event of a serious disablement or disease of a permanent nature that is incurable or unlikely to be cured, occurring before age 60 and as a result of which an employee's earning capacity is reduced by at least two-thirds.

Subject to a credit of at least 24 contribution months over the preceding 40 months, or contributions for at least two-thirds of the period since entry, subject to a minimum of 24 months, a "full pension" is payable: 50 per cent of the reference wage, augmented by 1 per cent for every 12 contribution months in excess of 24, subject to a maximum of 65 per cent. The reference wage is the average assumed wage over the last 24 contribution months.

If the above conditions are not satisfied, but subject to a credit of contributions for at least one-third of the period since entry and a minimum of 24 months, a "reduced pension" is payable: 50 per cent of the reference wage.

In either case, the pension is subject to the minimum of MYR 400 per month. If the invalidity pensioner needs constant attendance, a constant attendance allowance of MYR 500 per month is payable.

"Invalidity grant": if qualifying conditions for pension are not satisfied, subject to a minimum of 12 contributions, the invalidity pension contributions are reimbursed with the addition of simple interest.

"Survivors' pension" is payable on the death of an insured employee before age 60, or of an invalidity pensioner. The basic amount of the pension is the invalidity pension actually received by the deceased or which would have been payable if a claim had been made on the date of death. The provision relating to eligible beneficiaries, and to their shares, is identical to that which applies to the dependants' benefit.

"Funeral benefit" (MYR 1,500) is payable on the death of an invalidity pensioner, or of an insured employee before age 60 subject to the satisfaction of the minimum qualifying conditions for an invalidity pension.

"Rehabilitation benefit" (vocational and physical rehabilitation) is provided to employees who suffer invalidity.

"Dialysis benefit" is provided to employees suffering from chronic renal failure.

Adjustment of benefits

If substantial changes in the general level of earnings result from substantial changes in the cost of living, the situation should be examined and steps taken to maintain the real value of benefits.

APPENDIX 2
METHODOLOGY OF THE ACTUARIAL VALUATION

This actuarial review makes use of the comprehensive methodology developed by the Financial, Actuarial and Statistical Services of the ILO for reviewing the long-term actuarial and financial status of national social security systems. These modelling tools include a population model, an economic model, a labour force model, a wage model, a long-term benefits model, a short-term benefits model and an employment injury model. The review has been undertaken by adjusting the version of the ILO models built for the ninth actuarial review of SOCSO to reflect the situation of the system as at 31 December 2014.

The actuarial valuation starts with a projection of the future demographic and economic environment of Malaysia. Next, projection factors specifically related to SOCSO are determined and used in combination with the demographic and economic framework.

A2.1 MODELLING THE DEMOGRAPHIC AND ECONOMIC ENVIRONMENT

The use of the ILO actuarial projection model requires the development of demographic and economic assumptions related to the general population, the economic growth, the labour market and the increase and distribution of wages. Other economic assumptions relate to the future rate of return on investments, the indexation of benefits and the adjustment of parametres such as the maximum insurable earnings and the future level of flat-rate benefits.

The selection of projection assumptions takes into account the recent experience of SOCSO to the extent this information was available. The assumptions are selected to reflect long-term trends rather than giving undue weight to recent experience.

General population

General population is projected starting with the most current data on the general population, and applying appropriate mortality, fertility and migration assumptions.

Economic growth

Increase of the GDP growth, wage share of GDP and inflation rates are exogenous inputs to the economic model. The assumption on the long-term productivity of labour is the result of assumptions on the future evolution of the labour force, wage share of GDP and GDP growth.

Labour force, employment and insured population

The projection of the labour force, i.e. the number of persons available for work, is obtained by applying assumed labour force participation rates to the projected number of persons in the general population. Unemployment rates are assumed for the future and employment is calculated as the difference between labour force and unemployment.

The model assumes movement of participants between the groups of active and inactive insured persons.

Wages

Based on an allocation of total GDP to capital income and to labour income, a starting average wage is calculated by dividing the wage share of GDP by the total number of employed persons.

In the medium term, real wage development is checked against the labour productivity growth. In specific labour market situations, wages might grow at a pace faster or slower than productivity. However, due to the long-term perspective of the present review, the real wage increase is assumed to gradually converge with real labour productivity. It is expected that wages will adjust to efficiency levels over time.

Wage distribution assumptions are also needed to simulate the possible impact of the social protection system on the distribution of income, for example through minimum and maximum pension provisions. Assumptions on the differentiation of wages by age and sex are established, as well as assumptions on the dispersion of wages between income groups.

A2.2 MODELLING THE FINANCIAL DEVELOPMENT OF SOCSO

The present actuarial review addresses all revenue and expenditure items of SOCSO. Income and expenditures under the Employment Injury branch and the Invalidity branch are projected separately using two models specifically developed by the ILO for these two branches. Figure A2.1 presents the flow of financial balance projection. The most important components of this budget concern long-term benefits (IS and EI pensions). Pensions are projected separately by age and sex. For short-term

Figure A2.1 Flow of financial balance projection

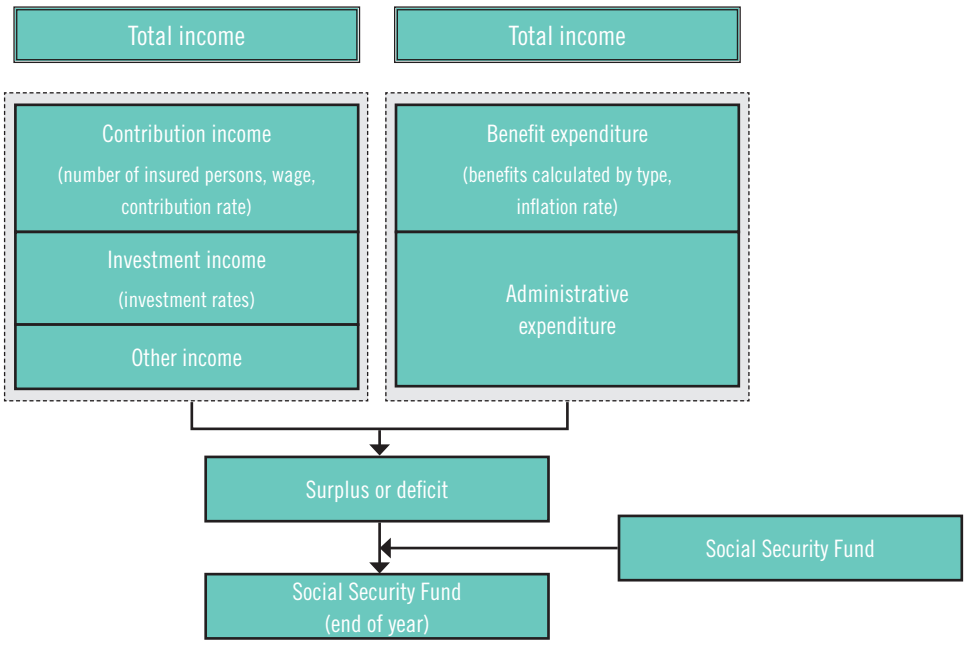
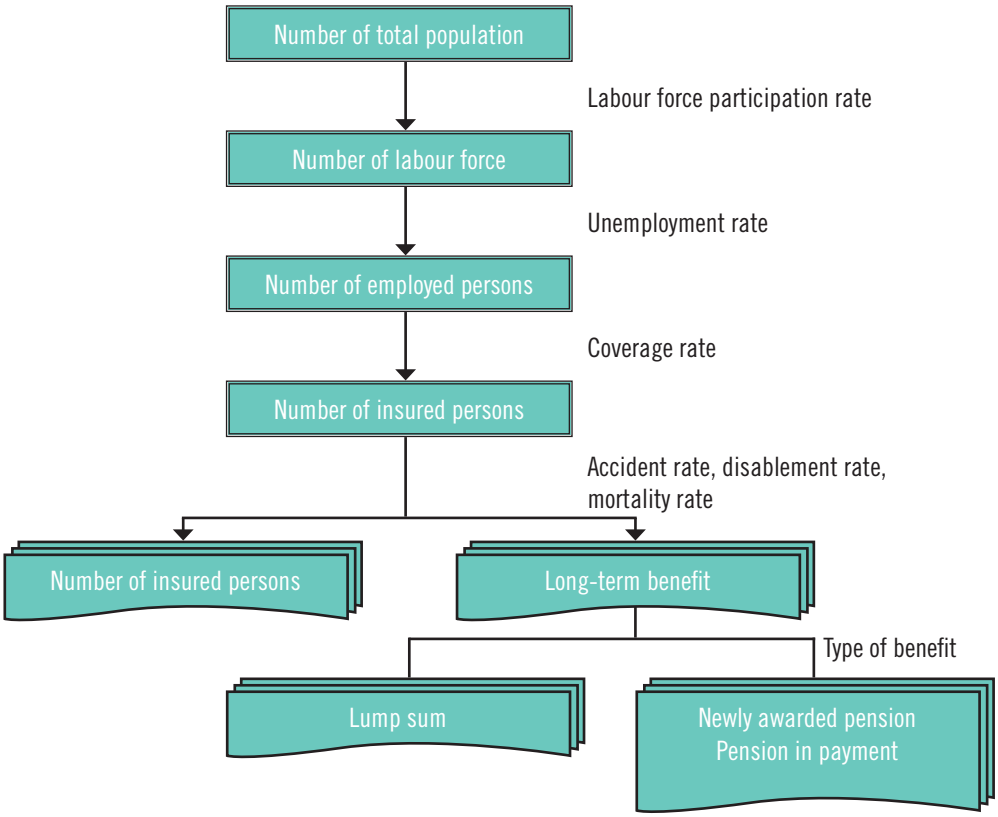


Figure A2.2 Projection methodology of insured persons and beneficiaries



benefits, income and expenditures are projected using simple projection methods based on recent experience. Figure A2.2 summarizes the projection methodology of insured persons and beneficiaries.

Purpose of pension projections

The purpose of the pension model is twofold. First, it is used to assess the financial viability of the long-term benefits of the schemes. This refers to the measure of the long-term balance between income and expenditure of the system. In case of imbalance, a revision of the contribution rate or the benefit structure is recommended. Second, the model may be used to examine the financial impact of different reform options, thus assisting policy-makers in the design of benefit and financing provisions. More specifically, the pension model is used to develop long-term projections of expenditures and insurable earnings under the system, for the purpose of:

- assessing the options to build up a contingency or a technical reserve;
- proposing schedules of contribution rates consistent with the funding objective; and
- testing how the system reacts to changing economic and demographic conditions.

Pension data and assumptions

In addition to the demographic and macroeconomic framework already described, pension projections require a set of assumptions specific to SOCSO.

The database as of the valuation date includes the insured population by active and inactive status, the distribution of insurable wages among contributors, the distribution of past credited service and pensions in payment. Data are disaggregated by age and sex.

System-specific assumptions such as the disability incidence rates and the distribution of leaving and re-entry by age are determined with reference to the system provisions and the historical experience under the system.

The projection of the annual investment income requires information on the existing assets on the valuation date. A rate of return assumption is formulated on the basis of the nature of the system's assets, the past performance of the Fund, the system's investment policy and assumptions on future economic growth and wage development.

Pension projection approach

Pension projections are performed following a year-by-year cohort methodology. The existing population is aged and gradually replaced by the successive cohorts of participants on an annual basis according to the demographic and coverage assumptions. The projection of insurable earnings and benefit expenditures are then performed according to the economic assumptions and the system's provisions.

Invalidity pensions and permanent disablement benefits are long-term benefits. Hence the financial obligations that a society accepts when adopting financing provisions and benefit provisions for them are also of a long-term nature.

It is not the objective of pension projections to forecast the exact development of income and expenditures of the system, but to check its financial viability. This entails evaluating the system with regard to the relative balance between future revenue and expenditure.

Projection approach for benefits other than pensions

The projection of funeral benefits is made according to the pension models. In each projection year, the funeral grant is multiplied by the number of deceased insured persons and deceased pensioners.

The projection of the constant attendance allowance (CAA) is made separately for the EI and IS branches by adapting the pension models. The probability of being awarded a CAA is based on SOCSO experience.

The projected cost of temporary disability benefits is the product of the projected number of temporary disability beneficiaries and the average amount of temporary disability benefit. The projected number of temporary disability beneficiaries is obtained by applying an incidence rate (varying by sex and age) to the EI insured population. The incidence rate and the average amount of benefit are based on SOCSO recent experience. The average amount of benefits is determined as follows:

Replacement rate x SalTD(s,x) x Dur(s,x), where

Replacement rate = 0.80

SalTD(s,x) = reference salary by sex and age

Dur(s,x) = average duration of temporary disability by sex and age

The projected cost of physical and vocational rehabilitation treatment by sex and age under the EI branch is the product of the projected number of beneficiaries and the average amount of benefit, which is the same for both sexes and all ages. The projected number of beneficiaries is obtained by multiplying an incidence rate (varying by sex and age) to the population of temporary disability beneficiaries. The projected cost of physical and vocational rehabilitation treatment by age and sex under the IS branch is the product of the projected number of beneficiaries (varying by sex and age) and the average amount of benefit (same for both sexes and all ages). The projected number of beneficiaries is obtained by multiplying a prevalence rate (varying by sex and age) to the population of new awards

of invalidity pension. The incidence rates and the average amount of benefits are based on SOCSO experience. The average amount of benefit is indexed to the salary growth.

The projected cost of the dialysis programme is the product of the projected number of beneficiaries and the annual average cost of dialysis. The projected number of beneficiaries by age and sex is obtained by multiplying a prevalence rate by age and sex to the projected insured population by age and sex. The average annual cost is the same for both sexes and all ages. The prevalence rate and the annual average cost of dialysis are based on SOCSO experience. The annual average cost of dialysis is indexed to the salary growth.

As to medical benefits, health screening facilities, cost of medical and appellate boards, activities promoting safety and health, penalties written off and general expenditure not elsewhere classified, their costs are projected on an aggregate approach. The costs of medical benefits and other benefits under the EI branch are projected separately as percentages of the cost of rehabilitation under the EI branch. The cost of the Health Screening Programme and other benefits under the IS branch is projected as a percentage of the cost of the CAA under the IS branch. The percentages are derived from SOCSO recent experience.

APPENDIX 3
SOCSO SPECIFIC DATA AND ASSUMPTIONS

In addition to the demographic and economic assumptions presented in Section 2, the projection of the future financial development of the Employment Injury and the Invalidity schemes requires a database specific to the system (characteristics of insured persons and pensions in payment) and some particular actuarial assumptions.

A3.1 DATA AND ASSUMPTIONS ON THE INSURED POPULATION

Number of insured persons

The 2014 population presented in table A3.1 relates to the population in all age groups, and therefore indicates the coverage of the Employment Injury branch. For the Invalidity Pension branch, only the population under age 60 is relevant. The respective figure retained for the valuation are as follows:

- Active population of Employment Injury branch: 6,198,660
- Active population of Invalidity Pensions branch: 6,045,278

Table A3.1 Insured persons, by age and sex, 2014

Age	Active		
	Male	Female	Total
15–19	191 206	127 286	318 491
20–24	582 466	461 633	1 044 099
25–29	651 326	537 423	1 188 749
30–34	564 590	424 695	989 285
35–39	437 209	310 963	748 172
40–44	371 669	248 163	619 833
45–49	311 237	199 790	511 027
50–54	251 813	145 513	397 326
55–59	153 436	74 859	228 295
60–64	74 810	28 874	103 684
65+	39 085	10 614	49 698
Total 15–59	3 514 952	2 530 326	6 045 278
Grand Total	**3 628 847**	**2 569 813**	**6 198 660**

Table A3.2 SOCSO coverage rates, by age and sex, 2014 and 2064

Age	2014		2064	
	Male (%)	Female (%)	Male (%)	Female (%)
17	74	92	74	92
22	58	69	58	69
27	46	55	46	55
32	41	48	41	48
37	41	48	41	48
42	40	42	40	42
47	37	38	37	38
52	34	37	34	37
57	31	31	31	31
62	28	24	28	24
Total	43	49	40	44

The projection of the insured population is calculated by applying constant coverage rates (by age and sex) to the employed population as determined under the economic framework. Age-specific coverage rates are assumed constant for the whole projection period. Coverage rates appearing in table A3.2 are calculated as the ratio of insured persons to the employed population at the corresponding age.

Insurable earnings

Table A3.3 shows the average insurable earnings of active contributors. Figures of the tenth valuation are shown for 2014. Figures for the two previous valuations are presented for comparison.

Table A3.3 Average monthly insurable earnings, 2006, 2010 and 2014

Age group	Eighth valuation (2006)		Ninth valuation (2010)		Tenth valuation (2014)	
	Male	Female	Male	Female	Male	Female
15–19	436	473	684	670	873	866
20–24	688	651	1 118	1 070	1 412	1 335
25–29	1 063	942	1 633	1 561	1 942	1 866
30–34	1 312	1 058	1 883	1 796	2 132	2 068
35–39	1 362	1 152	1 989	1 818	2 235	2 129
40–44	1 472	1 273	1 987	1 688	2 263	2 056
45–49	1 940	1 389	1 984	1 607	2 233	1 920
50–54	1 932	1 389	1 931	1 549	2 219	1 893
55–59	1 156	658	1 378	1 152	2 013	1 731
60+	843	555	1 001	898	2 034	1 861
Average	**1 214**	**960**	**1 625**	**1 472**	**1 948**	**1 806**

Source: SOSCO internal data.

Table A3.4 Density factors, by age and sex

Age	Male	Female
17	0.36	0.36
22	0.65	0.65
27	0.82	0.84
32	0.87	0.90
37	0.89	0.92
42	0.90	0.92
47	0.91	0.92
52	0.91	0.92
57	0.89	0.91
62	0.86	0.89
Total	**0.81**	**0.82**

The average monthly insured salary of the contributing population is derived from the salary class distributions of the employee database. These figures are based on an analysis of contributions in a given month of each year, so that they reflect the actual salary, i.e. they are not affected by the contribution density.

In order to better take into account the effect of minimum and maximum limits on salary-based benefits, the average salary by age and sex is refined into three salary groups: the 30 per cent lowest salaries, the 40 per cent medium salaries and the 30 per cent highest salaries. The distribution of insured persons according to their salary is assumed to remain constant over the projection period. The average salary by age, sex and salary group is projected according to the assumption of wage increase. The salary projection takes into consideration the increase of the maximum insurable earnings from MYR 3,000 to 4.000 on 1 June 2016.

Density of contributions

Density of contribution represents the proportion of the year during which the average contributor pays contributions. Density factor by age and sex were obtained from SOCSO. Sample density factors appear in table A3.4. They remain constant for the full projection period.

Accrued past credits

The complete distribution of accrued past credits for the active insured populations obtained from the administrative records of SOCSO is shown in table A3.5. It evolves during the projection according to the change in the covered population and certain contingencies.

A3.2 DEMOGRAPHIC ASSUMPTIONS RELATED TO THE SYSTEM

Mortality of insured persons

Mortality rates for the insured population have been assumed to be equal to the mortality rates of the general population (sample mortality rates are presented in table A3.6). Mortality rates are assumed

Table A3.5 Past service distribution of the active population, 2014

Age	Credit range (in months)																	
	1–12	13–24	25–36	37–48	49–60	61–72	73–84	85–96	97–108	109–120	121–132	133–144	145–156	157–168	169–180	>180	Total	Average credit (months)
Males																		
15–19	95	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	100	7
20–24	52	21	14	8	4	1	0	0	0	0	0	0	0	0	0	0	100	18
25–29	16	12	13	14	12	11	8	6	4	2	1	0	0	0	0	0	100	47
30–34	7	4	5	5	6	8	9	10	10	9	8	7	5	4	3	0	100	88
35–39	6	3	3	3	3	4	4	5	6	6	7	8	9	10	21	3	100	118
40–44	8	3	3	3	3	3	3	4	4	4	5	5	6	9	34	5	100	126
45–49	8	3	3	3	3	3	3	3	4	4	4	5	5	8	36	5	100	125
50–54	8	3	3	3	3	3	3	3	4	4	4	4	5	7	37	5	100	125
55–59	10	3	3	3	3	3	3	3	4	4	4	5	5	7	34	5	100	121
60+	13	4	4	4	4	4	4	4	4	4	5	5	6	7	24	4	100	108
All ages	21	8	7	6	5	5	5	4	4	4	4	4	4	4	14	2	100	80
Females																		
15–19	97	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	6
20–24	56	20	12	7	4	2	0	0	0	0	0	0	0	0	0	0	100	17
25–29	17	12	14	14	12	10	8	6	4	2	1	0	0	0	0	0	100	46
30–34	7	3	4	5	6	7	9	10	11	10	9	7	6	4	3	0	100	91
35–39	7	2	2	3	3	3	3	4	5	6	7	8	9	11	24	3	100	123
40–44	10	3	3	3	3	3	3	3	3	3	4	4	5	8	37	5	100	124
45–49	11	3	3	3	3	3	3	3	3	3	3	4	5	7	37	5	100	121
50–54	12	3	3	3	3	3	3	3	3	3	3	4	4	6	39	5	100	122
55–59	13	3	3	3	3	3	3	3	3	3	3	4	5	7	36	6	100	120
60+	15	4	4	3	3	3	3	3	4	3	4	4	5	6	30	5	100	111
All ages	24	8	7	6	5	5	4	4	4	4	3	3	3	4	14	2	100	76

Table A3.6 Sample mortality rates (per 100) by age and sex, 2014 and 2064

Age	Male		Female	
	2014	2064	2014	2064
0	0.667	0.284	0.551	0.261
5	0.030	0.011	0.026	0.012
10	0.029	0.010	0.021	0.009
15	0.065	0.024	0.029	0.012
20	0.117	0.042	0.038	0.016
25	0.108	0.039	0.045	0.019
30	0.136	0.050	0.061	0.026
35	0.206	0.077	0.090	0.038
40	0.285	0.111	0.135	0.057
45	0.414	0.168	0.222	0.095
50	0.646	0.273	0.374	0.160
55	1.014	0.448	0.600	0.257
60	1.525	0.703	0.938	0.406
65	2.351	1.137	1.494	0.666
70	3.707	1.918	2.557	1.217
75	5.668	3.134	4.585	2.331
80	8.613	5.100	7.647	4.132
85	12.123	7.708	10.758	6.228
90	15.585	10.626	13.925	8.622
95	19.081	13.957	17.102	11.377
100	100.00	100.00	100.00	100.00

to decline continuously during the projection period in line with the assumed increase in average life expectancy. This mortality pattern is also used to project survivors' benefits payable on the death of insured persons or pensioners. For invalidity pensioners, it is assumed that mortality rates are equal to five times those of the general population at age 20 years, decreasing gradually to two times at age 60 years and to one time at age 80 years.

Family structure

Information on the family structure of the insured is necessary for the projection of survivors' benefits. Assumptions have to be established on the probability of being married at death, the average age of the spouses, the average number of children, siblings and parents possibly eligible to benefits and their average age. Sample assumptions are shown in Table A3.7.

A3.3 DATA AND ASSUMPTIONS SPECIFIC TO THE EMPLOYMENT INJURY SCHEME

For the demographic and financial projections of the Employment Injury branch, a certain number of assumptions have to be set. They have been determined by using the experience of the intervaluation

Table A3.7 Family statistics

Age	Deceased male						Deceased female					
	Spouse		Orphans and siblings		Parents		Spouse		Orphans and siblings		Parents	
	Probability (%)	Average age	Average number	Average age	Average number	Average age	Probability (%)	Average age	Average number	Average age	Average number	Average age
17	1	17	-	-	1.16	48	0		-	-	1.12	47
22	4	21	0.48	14	1.18	52	8	25	0.74	7	1.06	52
27	18	26	0.62	10	0.96	57	21	30	0.73	8	0.88	57
32	54	30	0.86	7	0.54	61	43	35	1.06	7	0.55	62
37	73	35	1.43	8	0.30	66	58	40	1.52	9	0.31	66
42	87	39	1.97	11	0.14	70	62	45	1.64	12	0.25	71
47	93	43	2.08	13	0.11	75	61	50	1.29	14	0.17	76
52	93	48	1.58	15	0.07	80	51	55	0.73	16	0.09	80
57	89	52	0.84	16	0.02	84	41	60	0.29	18	0.04	85
62	81	57	0.36	17	-	-	29	64	0.07	19	-	-
67	73	61	0.15	18	-	-	18	69	0.02	20	-	-
72	66	66	-	-	-	-	7	74	-	-	-	-
77	60	70					0					
82	54	75					0					
87	49	80					0					

Table A3.8 Temporary disablement and rehabilitation, assumptions for benefit projections

Age	Temporary disablement				Rehabilitation	
	Incidence		Average duration (days)		Incidence as proportion of TD benefit recipients	
	Male	Female	Male	Female	Male	Female
22	0.0147	0.0048	49.9	47.1	0.0498	0.0497
27	0.0140	0.0037	53.6	49.6	0.0593	0.0520
32	0.0151	0.0041	54.9	52.1	0.0636	0.0554
37	0.0159	0.0052	55.8	54.8	0.0720	0.0586
42	0.0169	0.0061	58.1	57.6	0.0754	0.0675
47	0.0178	0.0073	59.6	58.6	0.0722	0.0589
52	0.0181	0.0088	61.2	59.7	0.0660	0.0515
57	0.0183	0.0107	61.6	60.8	0.0608	0.0489
62	0.0228	0.0119	60.6	60.8	0.0574	0.0507
67	0.0285	0.0134	55.9	60.9	0.0639	0.0522

period, i.e. 2011 to 2014. Generally speaking, an average of the four-year experience has been used. Smoothing techniques are used in order to avoid certain irregularities in the patterns due to small volume of data. Assumptions are determined by sex and single age. The following tables show the assumptions for selected ages.

Temporary disablement and rehabilitation

Table A3.8 presents the assumptions used for the projection of temporary disablement benefits and rehabilitation benefits.

The temporary disablement incidence rate is applicable to the average insured population.

The average amount of temporary disablement benefits is determined by using the projected earnings by sex and age and applying an adjustment factor of 0.9160.

The amount of rehabilitation benefit is uniform for both sexes and all ages. It starts at MYR 3,953 and increases every year according to the average wage increase.

Medical benefits are projected as 40 per cent of the amount of rehabilitation benefits. As to other benefits, including the cost of medical and appellate boards, activities promoting safety and health, penalties written off and general expenditure not elsewhere classified, these are estimated at 110 per cent of the amount of rehabilitation benefits.

Permanent disablement (including constant attendance allowances)

Several assumptions need to be set for the projection of permanent disablement benefits, as a distinction must be made between beneficiaries receiving a pension or a lump sum or a combination of both. The model determines the number of new awards and separates them into appropriate categories of payment by using the variables shown in table A3.9. The incidence of new cases of constant attendance allowances is determined as a proportion of pension awards.

Table A3.9 Permanent disablement and constant attendance allowance (CAA) incidence

Age	Permanent disability incidence		% of disabled awarded a pension		% of pensioners commuting 20 per cent		% of pensioners awarded a CAA	
	Male	Female	Male	Female	Male	Female	Male	Female
22	0.00355	0.00080	5.9	4.4	1.1	0.0	7.0	13.4
27	0.00398	0.00082	5.9	3.0	7.8	4.2	3.9	8.9
32	0.00468	0.00102	5.1	3.4	13.4	5.8	4.7	6.1
37	0.00550	0.00142	5.5	3.4	23.6	14.8	4.7	1.9
42	0.00611	0.00197	6.2	3.8	28.2	14.7	4.5	1.5
47	0.00634	0.00254	6.9	4.1	25.9	14.8	2.1	5.6
52	0.00646	0.00344	7.8	3.9	29.7	13.9	3.7	4.5
57	0.00671	0.00364	9.4	5.4	27.9	15.7	4.3	4.3
62	0.00652	0.00284	10.7	7.3	24.0	13.1	5.8	5.4
67	0.00573	0.00284	13.6	7.7	19.8	10.4	7.7	0.0

Table A3.10 Average degree of disablement (percentages)

Age	Pensioners	Beneficiaries receiving a lump sum only
22	48.2	4.6
27	41.7	4.6
32	39.4	4.8
37	38.7	4.8
42	34.4	5.1
47	35.0	5.1
52	34.6	5.4
57	35.2	5.6
62	37.8	5.8
67	39.9	5.6

Table A3.10 shows the average degree of disablement separately for pensioners (including those commuting part of their pension) and those receiving a lump sum only.

Work-related deaths

The model generates the work-related deaths (including commuting accidents) by applying a coefficient to the total number of deaths. Table A3.11 presents the coefficients applied in 2015. In the projection period, the coefficients are increased annually by 1 per cent in order to partially offset the impact of mortality improvement for all causes. It is therefore assumed that the frequency of work-related accidents will decrease more slowly than that the mortality rates in the population. The survivors' pensions are determined by using the assumptions related to family composition.

The amount of pension is based on the earnings of insured persons and adjusted to take into consideration the difference between the earnings of benefit recipients and those of insured persons. Adjustment factors are shown in table A3.12

Table A3.11 Proportion of deaths due to work-related accidents and diseases

Age	Male %	Female %
22	63.6	26.3
27	35.3	12.1
32	18.5	4.5
37	12.6	3.9
42	9.8	3.9
47	7.1	3.4
52	4.8	1.7
57	5.3	2.1
62	5.1	1.5
67	4.5	1.2

Table A3.12 Adjustment factors in calculation of benefits (percentages)

Benefit	Male	Female
PD New awards (Periodical)	90	76
PD New awards (LS only)	113	95
Death benefit	100	100

Table A3.13 Adjusted replacement rates of survivors' benefits (percentage)

Beneficiaries	Male insured	Female insured
Widow(er)s	60	60
Orphans	34	34
Parents	27	27

Table A3.13 shows the replacement rates that are used in projecting survivors' benefits. The replacement rates defined by the scheme provisions are adjusted to take into account the survivors' degree of dependence.

A3.4 ASSUMPTIONS SPECIFIC TO THE INVALIDITY SCHEME

For the projection of benefits under the Invalidity scheme, the same approach as in the EI branch has been used. Specific assumptions need to be determined for the invalidity pensions and the dialysis programme. The assumptions related to survivors' benefits (mortality and family composition) have been described in previous sections.

Invalidity incidence

Table A3.14 presents the incidence of invalidity pensions and grants as well as of constant attendance allowances, which are determined as a proportion of pension awards. The incidence rates of invalidity

Table A3.14 Incidence of invalidity

Age	Invalidity incidence		CAA awarded as % of invalidity pensions and grants	
	Male	Female	Male	Female
22	0.00004	0.00002	21	21
27	0.00014	0.00009	21	18
32	0.00033	0.00032	16	12
37	0.00077	0.00065	16	12
42	0.00131	0.00124	13	11
47	0.00267	0.00249	13	10
52	0.00516	0.00483	11	11
57	0.00854	0.00817	11	9

Table A3.15 Termination of invalidity

Age	Male	Female
22	0.02406	0.03422
27	0.02682	0.03713
32	0.02989	0.04029
37	0.03256	0.04108
42	0.03714	0.04188
47	0.04070	0.03659
52	0.03999	0.03168
57	0.03551	0.02213

are applied to the active insured population, and eligibility to a pension or grant is determined by the model based on the distribution of insured persons by years of service.

Table A3.15 presents the termination rates of invalidity for reasons other than death.

Dialysis programme

Table A3.16 presents the proportion of the covered population using the dialysis program. As there is no detailed information on the distribution of cost by sex and age, a uniform amount has been used for all combinations of sex and age. It is set at MYR 14,271 in 2014 and increases annually according to the average wage increase. Dialysis is a long-term treatment which is likely to last during the lifetime of a patient with end-stage renal disease, unless a kidney transplant replaces the dialysis. The projection of the programme cost would be improved if cohort data on the beneficiaries were available. The database would then allow identification of the following information for each dialysis beneficiary: identification number, sex, date of birth, date of beginning of dialysis, date of end of dialysis and reason. The identification number of the beneficiary should allow inquiry into other databases for specific analysis (e.g. the socio-economic environment of the patient, health history).

Table A3.16 Dialysis frequency rate (per 1,000 insured)

Age	Male	Female
22	0.07	0.04
27	0.27	0.23
32	0.70	0.83
37	1.40	1.44
42	2.25	2.24
47	3.89	3.49
52	6.20	5.37
57	8.82	8.31
62	6.95	6.92
67	3.67	4.37

Table A3.17 Adjustment factors in calculation of benefits (percentage)

Benefit	Male	Female
Invalidity pension	85	74
Survivors' pension	63	64

A3.5 OTHER ASSUMPTIONS

Physical and vocational rehabilitation in the Invalidity branch

The projected costs of rehabilitation are based on an assumed incidence rate applicable to the number of new invalidity cases and an average amount of rehabilitation benefits. The incidence rate of rehabilitation is determined by using the experience of the intervaluation period, i.e. 2011 to 2014. The amount of rehabilitation benefits is uniform for both sexes and all ages. It starts at MYR 5,294 and increases every year according to the average wage increase.

Other benefits in the Invalidity branch

Other benefits in the Invalidity branch include activities promoting safety and health, penalties written off and general expenditure not elsewhere classified. They are estimated at 110 per cent of the amount of constant attendance allowances.

Table A3.17 shows the adjustment factors that are applied to the earnings used in determining pension amounts in order to take into consideration the difference between the earnings of benefit recipients and those of other insured persons.

Table A3.18 shows the replacement rates that are used in projecting survivors' benefits. The replacement rates defined by the scheme provisions are adjusted to take into account the survivors' degree of dependence.

Indexing of system's parametres and pensions in payment

Maximum insurable earnings (MIE) are increased to MYR 4,000 per month on 1 June 2016. In the rest of the projection period, the MIE are indexed annually in line with the increase in the national average

Table A3.18 Adjusted replacement rates of survivors' benefits (percentage)

Beneficiaries	Male insured	Female insured
Widow(er)s	60	60
Orphans	40	40
Parents	31	37

wage. The MIE indexation is reflected in the maximum benefits from 1 June 2016 and in other fixed parametres of the system from 1 January 2017.

The pensions in payment are assumed to increase annually from 1 January 2015 according to the CPI.

Administrative expenses

For 2015, administrative expenses have been set at 18.5 per cent of benefits in order to match as closely as possible those of the budget of MYR 513.43 million. For the years 2016–29, they are projected by applying a factor of 18.25 per cent, decreasing by 0.25 each year until it reaches 15 per cent in 2029. During the period 2005–14, the average ratio of administrative expenditure over benefits was 15 per cent.

In 2030 and after, administrative expenditures increase according to the variation of earnings. The allocation of administrative expenditure by branch is discussed in the report. Projections under the base scenario apply the current allocation formula (55 per cent for EI and 45 per cent for IS).

A3.6 PENSIONS IN PAYMENT IN DECEMBER 2014: EMPLOYMENT INJURY BENEFITS BRANCH

Table A3.19 Permanent disablement pensions

Age	Male		Female	
	Number	Average monthly pension	Number	Average monthly pension
15-19	21	488	2	248
20-24	291	418	36	333
25-29	960	426	98	394
30-34	1 594	426	185	364
35-39	2 091	452	219	382
40-44	2 543	457	331	370
45-49	2 511	461	389	359
50-54	2 349	460	437	359
55-59	1 974	470	426	365
60-64	1 483	469	323	362
65-69	842	445	181	339
70-74	436	409	121	321
75+	321	397	76	336
Total	**17 416**	**452**	**2 824**	**361**

Table A3.20 Widows' and widowers' pensions according to sex of deceased spouse (EI)

Age	Male		Female	
	Number	Average monthly pension	Number	Average monthly pension
20–24	71	713	3	732
25–29	383	795	13	751
30–34	780	793	38	734
35–39	1 230	714	40	800
40–44	1 568	705	41	721
45–49	1 715	773	56	656
50–54	1 769	842	64	607
55–59	1 632	843	58	623
60–64	1 334	780	39	728
65–69	850	728	16	604
70–74	513	692	14	658
75+	452	638	26	600
Total	**12 297**	**768**	**408**	**676**

Table A3.21 Orphans', siblings' and parents' pensions (EI)

Age	Orphans		Siblings		Age	Parents	
	Number	Average monthly pension	Number	Average monthly pension		Number	Average monthly pension
0–4	798	477	30	108	35–39	8	262
5–9	2 410	431	176	120	40–44	200	257
10–14	4 164	405	743	156	45–49	759	262
15–19	6 146	439	1 897	212	50–54	1 678	297
20–24	1 576	485	642	240	55–59	2 365	329
25–29	28	562			60–64	2 325	361
30–34	21	542			65–69	1 736	371
35–39	17	507			35–39	1 043	402
40–44	22	492			40–44	780	397
45–49	13	524			45–49	320	432
50+	14	486			85+	182	404
Total	**15 209**	**436**	**3 489**	**199**		**11 396**	**347**

A3.7 PENSIONS IN PAYMENT IN DECEMBER 2014: INVALIDITY BENEFITS BRANCH

Table A3.22 Invalidity pensions in payment

Age	Male		Female	
	Number	Average monthly pension	Number	Average monthly pension
20–24	53	606	17	630
25–29	253	663	118	615
30–34	619	704	459	696
35–39	1 482	819	929	746
40–44	2 237	906	1 383	779
45–49	3 521	956	2 226	746
50–54	5 467	1 030	3 654	749
55–59	7 078	1 062	4 678	737
60–64	4 137	961	3 238	637
65–69	2 466	881	2 144	554
70–74	910	799	1 036	498
75+	328	612	431	483
Total	**28 551**	**962**	**20 313**	**689**

Table A3.23 Widows' and widowers' pensions according to sex of deceased spouse (IS)

Age	Male		Female	
	Number	Average monthly pension	Number	Average monthly pension
20–24	136	393	7	431
25–29	912	421	99	399
30–34	2 667	434	404	408
35–39	5 364	406	863	399
40–44	8 400	408	1 209	381
45–49	11 840	448	1 469	388
50–54	14 738	504	1 827	435
55–59	13 547	504	1 780	476
60–64	9 044	475	1 289	448
65–69	4 953	425	679	403
70–74	1 929	380	286	374
75+	798	345	278	311
Total	**74 192**	**460**	**10 183**	**419**

Table A3.24 Orphans', siblings' and parents' pensions (IS)

Age	Orphans		Siblings		Age	Parents	
	Number	Average monthly pension	Number	Average monthly pension		Number	Average monthly pension
0–4	3 780	260	14	65	35–39	6	178
5–9	13 885	237	117	78	40–44	73	154
10–14	29 506	235	508	90	45–49	529	144
15–19	46 525	257	1 912	126	50–54	1 876	160
20–24	12 222	284			55–59	3 580	178
25–29	275	313			60–64	4 360	200
30–34	209	317			65–69	4 048	220
35–39	116	277			35–39	3 049	249
40–44	86	285			40–44	2 337	267
45–49	-	-			45–49	1 132	295
50+	39	269			85+	602	301
Total	**106 643**	**252**	**3 188**	**122**		**21 592**	**217**

APPENDIX 4
DETAILED INFORMATION ON SOCSO RESULTS

This appendix presents demographic data of SOCSO.

A4.1 ACTIVE INSURED PERSONS

Table 4.1 presents the total number of active insured as reported in the Annual Reports.

Table A4.1 Number of active insured persons, 2010–14

Year	Number
2010	5 518 823
2011	5 761 626
2012	5 876 934
2013	6 089 054
2014	6 198 657

A4.2 DETAILED DATA FROM MOHR

Figure A4.1 presents the distribution of foreign workers registered under the WC Act.

Figure A4.1 Countries of foreign workers, 2015

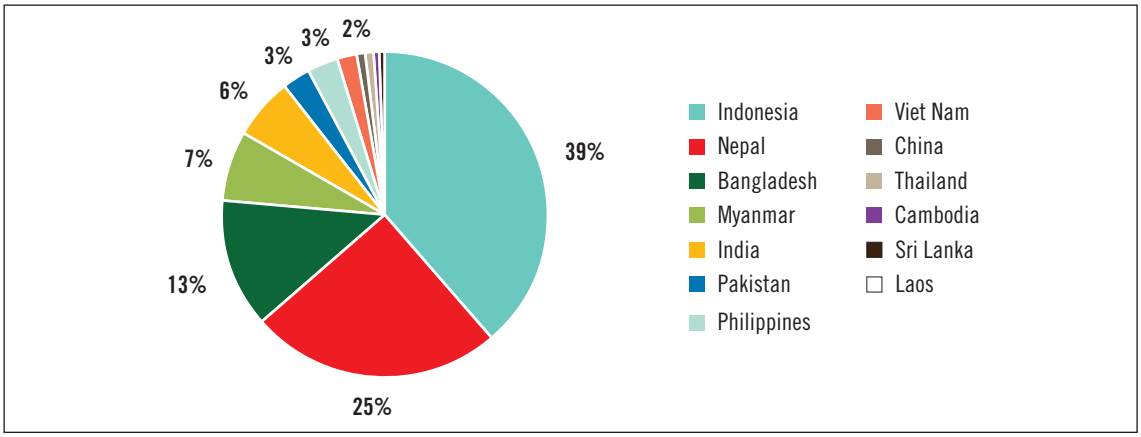


Table 4.2 presents detailed statistical data on benefits paid to foreign workers under the WC Act.

Table A4.2 Benefits paid to foreign workers, 2011–15

Year	Type of claim	Number of claims (cases)	Compensation (MYR)	Medical (MYR)	Repatriation (MYR)	Funeral (MYR)	Total amount of claims (MYR)
2011	Permanent disability	769	1 662 233	8 056	526	0	1 670 815
	Death	371	2 391 172	142 703	361 607	4 800	2 900 282
	Temporary disability	2 625	612 859	232 281	28 960	0	874 100
	Not classified	0	1 081 792	1 136 729	695 969	889 600	3 804 090
	Total	3 765	5 748 056	1 519 769	1 087 062	894 400	9 249 287
2012	Permanent disability	855	1 071 859	6 606	4 800	0	1 083 265
	Death	390	2 066 212	118 915	425 709	14 750	2 625 586
	Temporary disability	3 200	682 467	177 038	24 000	0	883 505
	Not classified	0	1 109 079	925 407	725 610	588 244	3 348 340
	Total	4 445	4 929 617	1 227 966	1 180 119	602 994	7 940 696
2013	Permanent disability	964	157 418	5 772	4 800	8 228	176 218
	Death	564	2 738 147	850	498 850	38 400	3 276 247
	Temporary disability	3 492	2 673 009	282 058	101 150	4 800	3 061 017
	Not classified	1	1 365 481	322 000	726 599	1 000	2 415 080
	Total	5 021	6 934 055	610 680	1 331 399	52 428	8 928 562
2014	Permanent disability	1 163	222 598	2 310	0	0	224 908
	Death	726	1 888 121	105	177 000	14 400	2 079 626
	Temporary disability	4 390	1 567 748	55 339	9 600	0	1 632 687
	Not classified	6	1 081 013	258 024	804 503	19 880	2 163 420
	Total	6 285	4 759 480	315 778	991 103	34 280	6 100 641
2015	Permanent disability	1 307	207 645	4 918	0	0	212 563
	Death	846	1 202 801	9 600	95 700	4 800	1 312 901
	Temporary disability	4 410	1 450 369	54 947	0	0	1 505 316
	Not classified	1	1 133 346	195 061	769 620	24 000	2 122 027
	Total	6 564	3 994 161	264 526	865 320	28 800	5 152 807

APPENDIX 5
ADDITIONAL RESULTS

This appendix presents detailed information on certain scenarios.

A5.1 EXTENSION OF COVERAGE TO AGE 60: INVALIDITY SCHEME

Table A5.1 Demographic projections, Invalidity and Survivors' Benefits branch, end of coverage at age 55, 2014–64

Year	Active insured	Numbers				% per active insured			
		Invalid	Dependants		Funeral grants	Invalid	Dependants		Funeral grants
			Widow (ers)	Orphans and parents			Widow (ers)	Orphans and parents	
2014	5 816 983	48 864	84 520	131 475	12 333	0.84	1.45	2.26	0.21
2015	5 902 579	51 313	90 311	144 629	11 863	0.87	1.53	2.45	0.20
2016	6 001 672	53 799	96 126	148 575	11 850	0.90	1.60	2.48	0.20
2017	6 272 920	56 472	102 062	153 089	11 859	0.90	1.63	2.44	0.19
2018	6 366 097	59 031	107 817	157 393	12 212	0.93	1.69	2.47	0.19
2019	6 456 931	61 353	113 246	161 229	12 201	0.95	1.75	2.50	0.19
2020	6 544 348	63 887	118 803	165 547	12 187	0.98	1.82	2.53	0.19
2021	6 609 181	66 696	124 567	169 604	12 170	1.01	1.88	2.57	0.18
2022	6 668 149	69 574	130 296	172 199	12 121	1.04	1.95	2.58	0.18
2023	6 721 505	72 511	135 952	174 131	12 075	1.08	2.02	2.59	0.18
2024	6 772 238	75 476	141 515	175 194	12 030	1.11	2.09	2.59	0.18
2029	6 974 601	90 497	167 932	172 814	11 841	1.30	2.41	2.48	0.17
2034	7 161 884	106 829	191 686	166 016	11 749	1.49	2.68	2.32	0.16
2039	7 270 317	123 917	211 903	159 265	11 303	1.70	2.91	2.19	0.16
2044	7 291 639	140 176	227 442	148 122	11 086	1.92	3.12	2.03	0.15

Table A5.1 continued on page 138

Table A5.1 continued from page 137

Year	Active insured	Numbers				% per active insured			
		Invalid	Dependants		Funeral grants	Invalid	Dependants		Funeral grants
			Widow (ers)	Orphans and parents			Widow (ers)	Orphans and parents	
2054	7 079 037	165 824	244 768	128 896	10 797	2.34	3.46	1.82	0.15
2064	6 774 080	182 704	245 253	113 166	10 463	2.70	3.62	1.67	0.15

Note: Active insured: number of insured contributing at least once during the year.

Table A5.2 Financial projections, Invalidity and Survivors' Benefits branch, end of coverage at age 55, 2014–64

Year	Insured salary bill	Invalidity pensions	Dependents		Funeral grants	Dialysis	Other[1]	Total	Total as % of insured salary bill
			Widow (ers)	Orphans and parents					
2014	109 939	497	461	383	17	115	13	1 487	1.35
2015	119 793	543	506	423	18	126	94	1 710	1.43
2016	139 811	593	556	437	18	139	105	1 846	1.32
2017	165 001	652	610	456	19	158	117	2 012	1.22
2018	180 614	720	670	481	21	174	130	2 196	1.22
2019	197 660	795	735	510	23	191	142	2 396	1.21
2020	216 264	883	807	547	24	210	156	2 628	1.21
2021	234 540	983	887	589	26	229	171	2 885	1.23
2022	253 992	1 095	973	631	28	250	187	3 163	1.25
2023	274 636	1 218	1 065	677	30	272	203	3 465	1.26
2024	296 458	1 353	1 164	724	31	296	221	3 790	1.28
2029	409 865	2 225	1 771	987	41	432	322	5 778	1.41
2034	542 584	3 507	2 581	1 272	52	610	451	8 474	1.56
2039	696 516	5 326	3 629	1 590	64	802	607	12 018	1.73
2044	888 278	7 757	4 936	1 904	79	1 027	790	16 494	1.86
2054	1 441 100	14 857	8 577	2 735	127	1 679	1 238	29 213	2.03
2064	2 316 962	26 429	13 996	3 994	206	2 790	1 811	49 226	2.12

Note: [1] Includes grants for invalidity and death, physical and vocational rehabilitation, constant attendance allowances, activities promoting safety and health, FCLB (penalties written off) and general expenditure not elsewhere classified.

A5.2 EXTENSION OF COVERAGE TO FOREIGN WORKERS: EI SCHEME

Table A.5.3 Demographic projections, Employment Injury Benefits branch, extension to foreign workers, 2017–64 (pensioners and temporary disablement)

Year	Average number of contributors	Numbers				% per active insured			
		PD pensions	Dependants		TDB	PD pensions	Dependants		TDB
			Widow (ers)	Other dependants			Widow (ers)	Other dependants	
2017	1 463 437	198	140	596	22 997	0.01	0.01	0.04	1.57
2018	1 464 901	590	418	1 774	23 020	0.04	0.03	0.12	1.57
2019	1 466 366	979	691	2 929	23 043	0.07	0.05	0.20	1.57
2020	1 467 832	1 364	960	4 062	23 066	0.09	0.07	0.28	1.57
2021	1 469 300	1 745	1 225	5 169	23 089	0.12	0.08	0.35	1.57
2022	1 470 769	2 124	1 485	6 242	23 112	0.14	0.10	0.42	1.57
2023	1 472 240	2 499	1 741	7 258	23 136	0.17	0.12	0.49	1.57
2024	1 473 712	2 870	1 992	8 194	23 159	0.19	0.14	0.56	1.57
2029	1 481 095	4 675	3 183	11 306	23 275	0.32	0.21	0.76	1.57
2034	1 488 516	6 391	4 269	12 161	23 391	0.43	0.29	0.82	1.57
2039	1 495 973	8 014	5 248	12 306	23 508	0.54	0.35	0.82	1.57
2044	1 503 468	9 530	6 129	12 312	23 626	0.63	0.41	0.82	1.57
2054	1 518 571	12 142	7 657	12 348	23 864	0.80	0.50	0.81	1.57
2064	1 533 825	14 138	8 741	12 134	24 103	0.92	0.57	0.79	1.57

Table A5.4 Financial projections, Employment Injury Benefits of foreign workers, extension of coverage, 2017–64 (costs reported according to the funding method)

Year	Insured salary bill	PD pensions	PD lump sums	Dependants		Funeral grants	TD	Other[1]	Total	Total as % of insured salary bill
				Widow (ers)	Orphans and parents					
2017	32 521	47	126	70	47	1	65	19	375	1.15
2018	34 963	51	136	74	49	1	70	21	400	1.15
2019	37 606	54	146	78	52	1	74	22	428	1.14
2020	40 475	58	157	83	55	1	79	24	458	1.13
2021	43 364	63	169	87	58	1	84	26	489	1.13
2022	46 435	67	181	92	61	1	90	28	520	1.12
2023	49 691	72	194	97	64	1	95	30	554	1.11
2024	53 124	77	207	102	68	1	101	32	589	1.11
2029	70 675	104	279	128	83	2	134	43	772	1.09

Table A5.4 continued on page 140

Table A5.4 continued from page 139

Year	Insured salary bill	PD pensions	PD lump sums	Dependants		Funeral grants	TD	Other[1]	Total	Total as % of insured salary bill
				Widow (ers)	Orphans and parents					
2034	91 148	134	361	153	99	2	172	56	977	1.07
2039	116 322	172	461	182	116	2	219	72	1 224	1.05
2044	148 397	219	588	225	143	3	279	92	1 550	1.04
2054	246 604	363	975	367	231	5	464	153	2 559	1.04
2064	416 956	614	1 649	610	378	7	785	257	4 301	1.03

Notes: The cost of PD pensions and dependants' benefits is the present value of pensions awarded during the year. For all other benefits, the cost is the payments made during the year.

[1] Includes medical benefits, physical and vocational rehabilitation, constant attendance allowances, activities promoting safety and health, penalties written off and general expenditure not elsewhere classified.

APPENDIX 6
SUPPLEMENTARY INFORMATION ON INVESTMENTS

A6.1 EXPECTED RETURNS ON VARIOUS ASSET CATEGORIES USED AS INPUTS FOR THE DETERMINATION OF THE REAL RATE OF RETURN ASSUMPTION

The long-term real rate of return assumption used for the present valuation has been set at 2.5 per cent per annum. The level of this assumption is the same as for the preceding valuation.

The methodology used to derive this long-term assumption uses as input an expected long-term nominal rate of return for each asset category. The following paragraphs provide details on the process used to determine the assumption for each asset category.

- ✓ *Money market instruments:* For money market instruments, the long-term expected nominal rate of return has been set at 3.30 per cent per annum. The resulting real rate of return (i.e. 0.78 per cent) is in line with rates currently available for term deposits with financial institutions with credit ratings meeting the stringent requirements of SOCSO's investment policy. It is also consistent with empirical experience observed under SOCSO's funds over the 10-year period preceding the valuation date (actual real rate of return of 0.78 per cent) and over the four years preceding the valuation date (actual real rate of return of 0.94 per cent). Such real rates of return are obviously much higher than those available under short-term government issues, reflecting the significant premiums observed in Malaysian markets between issues of high credit financial institutions vs. short-term government issues.
- ✓ *Government securities:* For government securities (Conventional & Islamic), the long-term nominal rate of return has been set at 4.70 per cent per annum, equivalent to a real rate of 2.15 per cent. Given the assumption made for short-term instruments, this represent a premium "long term vs. short term" of approximately +1.35 per cent. If we consider the yield curve normally observed under Malaysian bond markets, such differential is in our opinion appropriate, considering the characteristics of SOCSO's government securities portfolio (particularly the Islamic component), which includes a significant allocation to long-term bonds. The nominal rate assumption of 4.70 per cent is also consistent with the rates empirically observed over the 10- and 4-year periods preceding the valuation date (i.e .4.59 and 4.65 per cent respectively).
- ✓ *Corporate debt securities:* For corporate debt securities (Conventional & Islamic), the long-term nominal rate of return has been set at 5.20 per cent per annum, equivalent to a real rate of 2.64 per cent. Given the assumption made for government securities, this represents a corporate spread (risk premium for investing in high-quality corporate securities vs. government securities) of approximately +0.50 per cent. Historically, corporate spreads for mid-term bonds in Malaysian markets have typically been in the 0.6–0.8 per cent range. However, given that the duration of SOCSO's

corporate portfolio is significantly shorter than the government portfolio (largely due to very limited availability of long-term corporate bonds), the assumed spread has been reduced to 0.5 per cent to properly account for the particularities of the portfolios.

- ✓ *Domestic equities:* For Malaysian listed equities, the long-term nominal rate of return has been assumed at 8.70 per cent per annum. This implies a 4.0 per cent equity risk premium, when compared to the rate assumed for government bonds. A considerable amount of research has been devoted over the years in academic and financial circles to assess what could be viewed as a reasonable level of the equity risk premium on a long-term basis. Amongst that research was a comprehensive study performed by academics at the London Business School *(Millennium Book II: 101 years of investment returns)*; in that study, average returns obtained under the main asset categories in 15 major economies in the world were rigorously computed and analysed to develop pertinent information as to reasonable expectations for the future. One of the conclusions of this study was that, in matured economies, a reasonable expectation for the equity risk premium in relation to bonds was a range of 2 to 3 per cent. In view of the fact that Malaysia, as many other emerging economies, is expected to experience a higher GDP growth than matured economies for many years in the future, such higher growth should have an impact on returns of domestic equities; in this context, an additional 1 per cent over the upper level of the above range is certainly justified.
- ✓ *Foreign equities:* As to foreign equities, in line with the comments presented above on the long-term expectations of the equity risk premium, a level that is 1.2 per cent below that applicable to domestic equities is in our opinion reasonable.

For the equity and private debt securities, actual historical experience under SOCSO's invested assets are less pertinent in the process of developing appropriate expectations for the future, as the portfolios were until recently relatively small and experience thereon is therefore limited; furthermore, in the case of equities, returns determined under the basis used for financial reporting purposes (i.e. lower of book and market values) does not provide for a realistic pattern in the recognition of unrealized capital gains/losses, as such gains/losses are recognized only at the time of sale. With the transition under way to international accounting standards, equities and other "available for sale" assets will have to be recognized at market values and this should provide a more realistic basis for the development of expectations in the future.

As indicated in Section 2, the weighted average of the expected real rates of return for the different asset categories, the weight given to each asset category being in line with the allocation to each asset category under SOCSO's investment policy produces a real return of 2.32 per cent; for assumption-setting purposes, such crude rate has been grossed up to 2.50 per cent to account for different other elements that should also have an impact on future returns, as outlined in Section 2.

A6.2 INVESTMENT POLICY AND LONG-TERM ASSET ALLOCATION

For any social security programme, long-term ongoing sustainability is conditional upon the proper integration of the three fundamental policies underlying the strategic operations of such a programme, i.e. the *benefit policy* (i.e. the nature and structure of the benefits to be provided under the programme), the *funding/financing policy* (i.e. the level of contributions to be made by the stakeholders to provide for those benefits and as a corollary, the degree of pre-funding targeted, if any, by opposition to a pay-as-you-go approach) and the *investment policy* (i.e. the approach under which the set-aside reserves under the adopted funding policy will be invested in an attempt to optimize returns under a risk budget deemed acceptable to the stakeholders).

In the present report, various options have been comprehensively analysed as to potential changes to the benefit policy (Section 6) and different options have also been reviewed in connection with the financing of such benefits (Section 5). These various scenarios, as well as the basic actuarial valuation/

projections of both the EI and IS branches, have been analysed assuming no fundamental changes to the investment policy presently in place at SOCSO, particularly to the long-term asset allocation. As a corollary, the real rate of return assumption underlying all actuarial calculations/projections has been set at a very conservative level (i.e. 2.5 per cent per annum), consistent with the degree of conservatism inherent to SOCSO's investment policy, as illustrated in the previous sub-section of this Appendix 6. For purposes of this exercise, we have based our review on the contents of the *PERKESO's investment policy and guidelines*, as in effect as at the end of 2015 but modified by a few changes to the minimum/maximum allocations to some asset categories, which we understand were in the process of being adopted at that time and which were communicated to us at our meeting with SOCSO's personnel in November 2015.

Long-term asset mix allocation

A key element of the investment policy is the long-term asset allocation, i.e. the percentage of the aggregate assets to be invested in each of the three main asset categories, namely equity investments, fixed-income investments (including short-term instruments) and inflation-sensitive investments such as real estate or infrastructures (often referred to as "real assets"); typically, the allocation to various asset sub-categories within each of the three main categories would also be described in the investment policy.

As suggested in the International Social Security Association (ISSA) *Guidelines on investment of social security funds*, the target long-term asset allocation should be stipulated in the investment policy, with appropriate ranges around the target allocation for each asset category so as to allow for strategic deviations from the targets depending on market conditions and shorter-term expectations.

The establishment of the long-term asset mix policy should normally be made with due recognition of the nature of the liabilities and funding policy of the programme. In effect, the parametres which are generally most pertinent to the stakeholders in connection with a long-term social security programme are parametres such as the rate of required contribution and/or the funding ratio of the programme. Consequently, any quantitative assessment of the "risk vs. reward" trade-off inherent to different asset mix strategies should be performed by reference to these key parametres; this obviously implies that projections and analysis must be made in an asset/liability context, so as to properly assess the future stochastic evolution of those paramerers which are a function of both assets and liabilities.

In the case of SOCSO, the investment policy document per se does not include a long-term asset mix target, but rather specifies minimum/maximum allocations applicable to the main asset categories. These minima/maxima are shown in table A6.1.

Table A6.1 SOCSO investment policy, minimum/maximum allocations by asset category (figures in parenthesis represent changes that were in the process of being adopted at the end of 2015)

Asset category	Minimum allocation	Maximum allocation
Government debt securities	30%	No max.
Money market instruments	10% (5%)	No max.
Corporate debt securities	No min.	20% (25%)
Equities		
Total	No min.	30% (32%)
Foreign	No min.	US$200M (US$500M)
Properties	No min.	5% (8%)

Table A6.2 SOCSO asset allocations at the end of 2014

Equities		Fixed-income investments		
10% Domestic	3% Foreign	39% Domestic Government	37% Short-term & Bank deposits	11% Corporate dept

In practice, the actual allocation as at the valuation date was heavily oriented towards bonds and short-term instruments and could indeed be viewed as very conservative. In effect, for all asset categories except foreign equities, the actual allocation was far from the minima/maxima stipulated in the investment policy.

As at the end of 2014, the asset allocation was "13 per cent equities + 87 per cent fixed income", with no explicit allocation to inflation-sensitive asset categories. The sub-allocations within the equity and fixed-income segments are shown in table A6.2.

It should be noted that all the above allocation percentages are based on values used for financial reporting purposes (essentially amortized cost for bonds and lower of cost or market for equities); these allocations therefore slightly differ from those used to derive the real rate of return assumption in Section 2, which were based on market values for "available for sale" investments (mainly equities), in line with revised accounting standards.

When compared with asset allocations typically used in social security programmes around the world, the above allocation is indeed conservative. We are aware that SOCSO has recently monitored an asset-liability study with the assistance of an outside consulting firm and that it was this study that has led to the adjustments contemplated in connection with some of the minima/maxima included in the investment policy.

We have not performed at this time any asset/liability projections for SOCSO's programmes, as such stochastic projections would have been beyond the scope of our mandate. However, based on our experience with several stochastic asset/liability studies performed for similar social security programmes, we do believe that such stochastic projections would have revealed the following patterns as desirable changes to the strategy in an attempt to improve expected returns of SOCSO's invested assets without significantly altering the risk implications for the programmes' stakeholders:

(1) The target allocation to short-term instruments should be reduced to a level much lower than that observed at the valuation date (i.e. 37 per cent). In effect, empirical data show that on a long-term basis, short-term investments are the less performing asset category and there is therefore a significant "price to pay" in maintaining a significant allocation to that asset category; typically, the target level is set at the minimum level necessary to efficiently manage short-term liquidity requirements, e.g. 5 per cent and often much lower.

(2) Optimal allocation to equities would typically be much higher than that observed for SOCSO's funds at the valuation date. In market economies, equity investments should outperform fixed-income investments over the long term; this is evidenced by empirical data over most long periods of observation. However, equity returns are much more volatile than fixed-income returns, and a proper balance must be decided upon between the extra returns expected from equity investments (the "reward") vs. the additional volatility of returns resulting from higher equity allocations (the "risk"). This is particularly important in the context of the adoption of "mark to market" accounting standards for "available for sale" investments. This being said, asset/liability projections would typically show that an equity allocation at least in the 30–35 per cent range would significantly improve the arbitrage between reward and risk, when compared to the current allocation.

Table A6.3 SOCSO asset allocations at the end of 2014 compared to a possible target allocation

Asset category	Allocation at valuation date (%)	Target allocation to be considered (%)
Government debt securities	39	37
Corporate debt securities	11	22
Money market instruments	37	5
Sub-total – fixed income	**87**	**64**
Equities – domestic	10	17
Equities – foreign	3	14
Sub-total – equities	**13**	**31**
Inflation-sensitive investments	**0**	**5**
Total	**100**	**100**

(3) Allocation to inflation-sensitive asset categories (real estate, infrastructures, commodities, etc.) could also improve the risk vs. reward arbitrage inherent to the asset allocation, through additional portfolio diversification; these asset categories are particularly efficient in programmes where benefits and liabilities are highly sensitive to price inflation, as is the case under SOCSO's programmes. Although such allocation could in practice be constrained by the availability of such investments and also by the specialized expertise required in this connection, an allocation in the 11–15 per cent range would be typical for programmes such as those administered by SOCSO.

(4) The current sub-allocation between domestic and foreign securities within the aggregate equity allocation is also atypical. In effect, strictly from a theoretical standpoint, stochastic projections would invariably show that allocation to foreign equities should represent at least 40 per cent of the aggregate equity allocation so as to improve portfolio diversification and thereby the "risk vs. reward" arbitrage. Again, there might however be practical constraints (political and others) associated with significant increases of allocations to foreign investments.

(5) Currently, approximately 20 per cent of the aggregate bond portfolio is invested in high grade corporate bonds (i.e. 11 per cent of an aggregate bond allocation of 50 per cent). Asset/liability projections typically show that a higher allocation to high grade corporate bonds would improve returns without significantly altering the overall risk profile of the portfolio, especially if bonds are generally held to maturity, as it is the case at SOCSO. As such, an increase of the allocation to high grade corporate securities could be considered.

For illustration purposes and taking into account practical constraints observed vis-à-vis some asset categories, the target asset allocation shown in table A6.3 would be in line with the above comments on possible improvements of the risk vs. reward trade-off applicable to SOCSO's funds, i.e. improving returns without significantly increasing the related investment risks.

The above target allocation policy is presented for illustration purposes only and could still be considered as conservative when compared to asset allocations typically privileged under many social insurance programmes. Furthermore, the actual implementation of a revised asset mix policy would imply a more in-depth analysis and fine-tuning of the overall investment strategy, encompassing elements such as:

✓ fine-tuning of the overall allocation between the main asset categories to properly recognize constraints and other practical limitations associated with investments in some asset categories, such as foreign investments and inflation-sensitive investments;

Table A6.4 Employee Provident Fund, strategic asset allocations and allocations at the end of 2015

Asset category	EPF strategic asset allocation (%)	EPF actual allocation at end of 2015 (%)
Government debt securities	51	26
Corporate debt securities		25
Money market instruments	3	2
Sub-total – fixed income	**54**	**53**
Equities – domestic	36	24
Equities – foreign		20
Sub-total – equities	**36**	**44**
Inflation-sensitive investments	**10**	**3**
Total	**100**	**100**

- ✓ fine-tuning of the allocation within each of the three main asset categories, e.g. potential inclusion of allocations to foreign securities in the fixed-income allocation and/or in the inflation-sensitive allocation; also, possible additions of some specialized mandates could be considered within the equity allocation (e.g. small cap equities, private equities, etc.);
- ✓ articulation of the various investment mandates with the objective of setting a proper and efficient balance between:
  - internal vs. external management;
  - indexed vs. active management;
  - traditional vs. synthetic portfolios; and
  - hedged vs. unhedged portfolios for foreign mandates;
- ✓ possible addition of specialized mandates such as tactical asset allocation, strategic asset allocation, currency management, etc.; and
- ✓ establishment of a proper transition path from the current policy to the alternative policy.

As mentioned previously, we believe that the target asset allocation should be reflected in the investment policy document, as it indeed constitutes a fundamental element of such policy. The other components mentioned in the preceding paragraph should also be reflected in the investment policy itself. The actual decisions on these other elements would be a function of the allocation decided upon for each asset category; we would be pleased to provide assistance with the development of these strategies, if required, when preliminary decisions are taken vis-à-vis the target asset allocation strategy.

It is interesting to note that the patterns mentioned above have largely been implemented in the strategies adopted in connection with the Employee Provident Fund. For information purposes, table A6.4 shows the current target asset allocation under the EPF as well as the actual allocation observed under the EPF as at the end of 2015:

A6.3 ALTERNATIVE ASSET MIX POLICIES AND POTENTIAL IMPLICATIONS OF VALUATION RESULTS

Changes to the long-term asset allocation policy to enhance expected returns would obviously have an impact on the application of the "building block" methodology used to derive the real rate of return assumption used for the actuarial valuation and therefore on valuation results. Such an impact could be

Table A6.5 Building block methodology under three asset mix policies

Asset category	Expected real rate of return (%)	Assumed SOCSO allocation (%)[1]	Target allocation in table A6.3 (%)	EPF target allocation in table A6.4 (%)
Government debt securities	2.15	38	37	26
Corporate debt securities	2.64	12	22	25
Money market instruments	0.78	34	5	3
Sub-total – fixed income		**84**	**64**	**54**
Equities – domestic	6.05	12	17	20
Equities – foreign	4.88	4	14	16
Sub-total – equities		**16**	**31**	**36**
Inflation-sensitive investments	4.88	**0**	**5**	**10**
Weighted average of expected real rate of return		**2.32**	**3.37**	**3.72**
Assumption that could be justified for actuarial valuation purposes (including gross-up for diversification effect and active management of some mandates)		**2.50**	**3.50**	**3.90**

Note: [1] Based on market values for "available for sale" categories of investments.

very significant and in this section, we illustrate the sensitivity of valuation results to possible changes to the long-term asset allocation.

Table A6.5 compares the application of the building block methodology under the current asset mix policy with that under two alternative asset allocations, i.e. that presented in the above sub-section as a possible target asset allocation for SOCSO's funds and that presented in the EPF Annual Report as its long-term strategic asset allocation.

It will be seen that the allocation presented in the preceding sub-section as a potential target asset allocation for SOCSO's funds would theoretically justify a 1.0 per cent increase to the real rate of return assumption, i.e. from 2.5 to 3.5 per cent per annum. As to the EPF strategic asset allocation, it would justify an even higher real rate of return assumption, as a result of higher allocation to equity and inflation-sensitive investments.

The potential impact of such a change in assumption on valuation results has already been illustrated in section 4.4 of the report. It is worth noting the positive implications of a revision to the target asset allocation so as to justify an increase of 1.0 percent to the real rate of return assumption for actuarial valuation purposes.