香港退休保障的未來發展

TECHNICAL REPORT ON ACTUARIAL PROJECTIONS
(English Version Only)
Table of Contents

Executive Summary

Introduction

Summary of Key Assumptions

Chapter 1

*Projection for Government Expenditure on Existing Social Security Schemes for Elderly in Hong Kong from Year 2013 to 2041*

Chapter 2

*Adequacy: The Retirement Income Replacement Rate Approach*

Chapter 3

*Sustainability: A Dynamic Projection of the Underlying Universal Pension Fund*

Chapter 4

*Affordability: Cost Sharing Among Individuals, Private Sectors and the Government*

Conclusion

Appendices
Executive Summary

A. Purpose of the Report

The major purpose of this technical report is to provide information concerning data sources, assumptions, methodology and its limitations, and preliminary results of the projections discussed in the main research report for the government. Such information should facilitate readers of the main report a better understanding of the financial arrangement of the selected proposals and the factors that influence costs, and thus contribute to an informed discussion of issues related to the finances of the proposals.

Most of the selected proposals received by the Research Team are still in the conceptual stage and the exact operational details of them have not yet been finalised. The Research Team has to make a number of working assumptions in order to provide a common ground to compare these proposals. Furthermore, the study period is fixed as 2013-2041 (29 years) due to availability of data; whilst in most developed countries a much longer projection period is often used when studying their social security provisions. Therefore, this report should not be used to substitute a formal actuarial report of the final proposal(s) with concrete operational details and longer projection period.

B. Scope of the Report

The Introduction section presents a general overview of the report and labels the six selected proposals: P1 (The Hong Kong Federation of Trade Unions), P2 (The Alliance for Universal Pension), P3 (The Professional Commons), P4 (The Democratic Alliance for the Betterment and Progress of Hong Kong), P5 (The New People's Party) and P6 (Dr. C.K. Law).
The next section provides a summary of key assumptions with explanations on how these assumptions are derived. Serving as the baseline, projections for the total government expenditure on existing social security schemes for elderly in Hong Kong from Year 2013 to 2041 are firstly examined under different growth and price scenarios in Chapter 1.

Estimates of income replacement indicators using a modified OECD (The Organization for Economic Cooperation and Development) methodology with Hong Kong specific assumptions for various proposals are given in Chapter 2.

Chapter 3 examines the financial soundness (sustainability) of each proposed scheme with Universal Pension Fund (UPF), now and in the future. In particular, the balances of the Fund will be projected from 2013 to 2041 according to the assumed structure of each proposal.

Finally, Chapter 4 attempts to project the absolute and relative amount of financial resources of each proposal to be borne by various sectors in the society. The final section concludes the technical report.

C. Main Findings

Chapter 1

Under the Base Scenario the projected total government expenditure (in 2013 constant dollar) on existing social security schemes for elderly (65+) in Hong Kong increases from $21.72 billion in 2013 to $59.14 billion in 2041, approximately a 170% increase during the period. The increase is largely due to the growth of elderly population in Hong Kong. If we express the projected nominal expenditure as a percentage of projected total nominal government expenditure, this percentage is expected to increase roughly from 5% in 2013 to 8% in 2041. Furthermore, if we express the projected nominal amount as a percentage of projected nominal GDP, the results are 1% in 2013 and 2% in 2041.
Chapter 2

There are many types of income replacement indicators defined by OECD and they have different implications. If we focus on the net replacement rates, which shows the value of the pension for specific individuals as a percentage of their own earnings (net of taxes and social security contributions, if any) when working. Under the existing system, rates are 48.0% for men and 44.3% for women in Hong Kong. Whilst there is no standard definition of what an adequate pension level should be, this set of rates is fairly comparable to 54.4%, the OECD average over 34 countries. However, the OECD average does not include informal support from children. If we remove this item from the calculation, the Hong Kong rates would drop about 8%.

The net replacement rates would be raised for low-income earners under the proposals with universal pension benefits. For example, consider P2, the projected rates for this proposal are 68.2% and 73.8% for men and women, respectively, for workers whose monthly wage is half of the population median level. For proposals which aim at strengthen the protection of low-income groups, such as P4, the corresponding rates are 79.7% (men) and 77.2% (women) for the same low-income group earners.

For high-income groups (say, monthly salary is 3 times of the population median earnings), the rates are 27.8% for men and 30.6% for women under the existing system. The corresponding rates are 23.3% (men) and 27.3% (women) under P2, and the rates are 28.6% (men) and 31.5% (women) under P4. It should be noted that P2 proposes transferring half of an individual’s MPF contributions to the UPF; the net replacement rate results show the potential income re-distribution effects in various proposals.

Although higher replacement rates seem preferable, they do not come without cost. The next two chapters examine the sustainability and affordability of the selected proposals.
Chapter 3

The sustainability study has been performed to proposals with UPF (i.e., P1, P2 and P3). A dynamic projection of cash inflows, outflows and the balance of UPF under these proposals from 2013 to 2041 are conducted. Whilst there is no standard definition of “sustainability”, it is reasonable to expect that a sustainable proposal is able to meet the following requirement:

*In long-term, the projected cash inflow and assets of the UPF shall be sufficient to cover the associated benefit payments from the proposed scheme every year in the future. It implies that the projected UPF balance should be always positive during the study period (and hopefully, beyond the study period).*

For P1, the projected UPF balance (at 2013 constant prices) would turn negative (-$9 billion) in 2030; and the deficit would continue to accumulate to -$248.5 billion in 2041. The sustainability of P1 is questionable under the current specification.

For P2, the projected UPF balance (at 2013 constant prices) would always stay in the positive regime from 2013 to 2041, with a peak at $238.2 billion in 2027. However, the projected outflows are expected to take over the inflows after 2028; creating a structural annual deficit after that year. The UPF balance in 2041 would still stand at positive value of $127.0 billion; it meets the sustainability requirement within the study period (2013-2041). However, it would need an extended study to examine its sustainability beyond 2041.

For P3, the projected UPF balance (at 2013 constant prices) would turn negative (-$20.1 billion) in 2036; and the amount of deficit would continue to accumulate to -$116.7 billion in 2041. The sustainability of P3 is questionable under the current specification.
Chapter 4

Affordability refers to the total and extra financial burden to individuals, companies and the government after the pension reform. There is no standard definition of affordable pension systems. The annual fund inflows to the UPF can be projected and they have been decomposed by sources (the government, companies and individuals) to examine how the financial burden is shared among different parties. If the UPF balance turns negative, it creates an unfunded liability and should be treated as a cost to the system. On the other hand, the positive UPF balance is an asset to offset the cost to the scheme.

The accumulated total costs (decomposed by sources) of various proposals for the entire study period (2013-41), in billions of 2013 constant Hong Kong dollars, are: $1,970 for P1 (benefits payment period 2016-41) -- government (59%), companies (18%), individuals (10%), investment income (-0.4%) and unfunded liability (13%); $2,206 for P2 (benefits payment period 2013-41) -- government (46%), companies (35%), individuals (21%), investment income (5%) and positive UPF balance (-6%); $2,059 for P3 (benefits payment period 2017-41) -- government (49%), companies (22%), individuals (22%), investment income (1%) and unfunded liability (6%); $1,398 for P4 (benefits payment period 2013-41) -- government (100%); and $1,190 for P5 (benefits payment period 2013-41) -- government (100%).

Some components of the total projected cash inflows to the UPF in each year would be incurred with or without the pension reform. In order to examine the “marginal” financial implications by the proposal, these “extra” financial costs are also studied.

The accumulated “extra” financial resources required by various proposals for the entire study period (2013-41), in billions of 2013 constant dollars, are: P1 -- government ($274), companies ($229), individuals ($201), net investment income (-$7) and unfunded liability ($249); P2 -- government ($50), companies ($321), individuals ($459), investment income ($106) and with a surplus ($127); P3 -- government ($131), companies ($460), individuals ($453), investment income ($22) and unfunded liability ($117); P4 -- government ($444); and P5 -- government ($235). For P1 and P2, there are MPF amounts contributed by employers originally to
employees, but they are transferred to the UPF under the proposal. If such transfers are re-classified as employees’ extra cost, the total extra cost for employees (individuals) would be $327 (adding $126 to the original $201) for P1 and $902 (adding $443 to the original $459) for P2.

D. Uncertainty of Results

To measure the sensitivity of the long-term projected financial position of the proposals to future changes in the economic environments, a variety of sensitivity tests were performed. The tests and results are presented in Chapter 2 and Chapter 3 in this report.

Robustness tests were also performed to measure the impact on the financial sustainability of the proposals under an adverse and a shock scenario. The results show that P2 is still sustainable within the study period under the shock scenario, but the UPF balance would be significantly reduced from $127.0 billion (no shocks) to $79.1 (with shocks) in 2041. On the other hand, P2 is marginally not able to sustain within the study period under the adverse scenario, its projected UPF balance would just turn red (at -$3.8 billion) first time in 2041.

E. Conclusion

Adequacy, sustainability, affordability and robustness are the four primary goals of pension reforms defined by the World Bank. This report aims to provide a quantitative framework for assessing the selected proposals in the main report based on these primary goals. The results in this report should facilitate a better understanding of the financial arrangement of the selected proposals, and thus contribute to an informed discussion of issues related to the finances of the proposals.
Introduction

1. This technical report provides information concerning data sources, assumptions, methodology and its limitations\(^1\), and preliminary results of the projections discussed in the main research report.

2. The purpose of this report is to facilitate the discussion of various pension reform proposals described in the main report for exploring future direction of Hong Kong retirement protection.

3. This technical report should not be viewed as a formal professional actuarial appraisal report of the proposals. It is recommended that the Government should engage professional actuaries to conduct a formal and comprehensive actuarial evaluation of the final proposal(s) in the next stage.

4. The current system is served as the baseline for comparison. For convenience, it is termed as \(P_0\) (status quo). The other pension reform proposals described in the main report are labelled as:

   - \(P_1\) - the proposal by The Hong Kong Federation of Trade Unions (工聯會)
   - \(P_2\) - the proposal by The Alliance for Universal Pension (爭取全民退保聯席)
   - \(P_3\) - the proposal by The Professional Commons (公共專業聯盟)
   - \(P_4\) - the proposal by The Democratic Alliance for the Betterment and Progress of Hong Kong (民建聯)
   - \(P_5\) - the proposal by The New People's Party (新民黨)
   - \(P_6\) - the proposal by Dr. C.K. Law (羅致光)

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\(^1\) The readers are reminded to note limitations of the results listed at the end of each Chapter.
5. The projection starting point is June 2013. The “current” pension system in this technical report refers to the corresponding schemes as of that date.

6. Hong Kong demographic data and relevant social and financial statistics used in this report have been kindly provided by the related government agencies, such as Census and Statistics Department, Labour and Welfare Bureau, Economic Analysis and Business Facilitation Unit, and Financial Services and the Treasury Bureau. The Research Team is grateful to their valuable advice and data input.

7. The Research Team adopts the same macroeconomic and price assumptions as employed by the Working Group on Long-Term Fiscal Planning (the “LTFP WG”). For other assumptions specific to the projection models used in this report, the Research Team makes own assumptions after considering the relevant information and historical data.

8. The projection period is from 2013 to 2041 (29 years, inclusive), the same projection horizon adopted by the LTFP WG. The Hong Kong population projection data are publicly available up to 2041.

9. Given such a long time horizon of near 30 years, the degree of uncertainty inherited in the projections is unavoidably very large. The projection figures in this report are for providing a common ground to compare different pension reform proposals in Hong Kong, rather than aiming for precise predictions.

10. On the other hand, the Research Team notices that in the context of setting public policy on pensions, 29 years is a very short time period. In most developed countries, a much longer projection period is often used when studying their social security provisions (e.g. Canada: 70+ years, Japan: 80+

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years). It should be emphasized that the results in this report are based on a 29-year projection and it does not provide any information regarding the sustainability of the various proposals after the year 2041.

11. It should be noted that the results in this technical report are based on assumptions concerning uncertain future events and outcomes and that the eventual experience will most likely differ, possibly materially, from that indicated in the projections.

12. The main content of this report is to provide a quantitative analysis on the adequacy, sustainability and affordability of the selected pension reform proposals discussed in the main report. Since there are many non-quantitative factors and characteristics associated with each proposal, the Research Team will not attempt to numerically rank the proposals.

13. This report contains four chapters. Serving as the baseline, projections for the total government expenditure on existing social security schemes for elderly in Hong Kong from Year 2013 to 2041 are firstly examined under different growth and price scenarios in Chapter 1.

14. Adequacy, sustainability, affordability and robustness are the four primary goals of pension reforms defined by the World Bank. Adequacy refers to both the absolute level as well as relative level of retirement income that the proposed pension system will provide. Largely based on The Organization for Economic Cooperation and Development (OECD) methodology with Hong Kong specific assumptions, Chapter 2 estimates income replacement rates

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3 Extension of the projection horizon to 70+ years would require a large number of additional assumptions (e.g. future fertility rates, mortality rates, migration patterns, labour participation rates, further economic assumptions, ...etc.) , which beyond the scope of the current study. However, the Research Team recommends the Government to consider conducting studies with longer horizon in the next stage.


6 Results for Hong Kong using OECD standard economic assumptions are available in OECD (2013) Pensions at a Glance Asia/Pacific 2013.
for various proposals.

15. Chapter 3 examines the financial soundness (sustainability) of each proposed scheme with Universal Pension Fund (i.e., P1, P2 and P3), now and in the future. In particular, the balances of the Fund will be projected from 2013 to 2041 according to the structure of each proposal.

16. Robustness refers to the capacity of the pension scheme to withstand major shocks and to remain viable in the face of unforeseen circumstances. The major outcome in this regard is the ability of the system to sustain income-replacement targets in a predictable manner over the long period. The sensitivity analyses, as well as an adverse and a shock analysis in Chapter 3 present a range of variation in basic assumptions to illustrate the viability of the each proposal over the 29-year projection period.

17. Although higher replacement rates seem preferable, they do not come without cost. Affordability refers to the total and extra financial burden to individuals, companies and the government after the pension reform. Chapter 4 attempts to project the absolute and relative amount of financial resources of each proposal to be borne by various sectors in the society.

18. **Acknowledgements**: The first draft of this technical report has been sent to the Actuarial Society of Hong Kong (ASHK) for comments and suggestions. The ASHK has kindly formed a Workgroup and reviewed general contents (not detailed calculations and computer programmes) of the first draft of this technical report. Constructive comments and suggestions have been provided by the Workgroup to the Research Team. Wherever possible, the Research

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7 *Supra*, note 4, page 57.
8 研究團隊曾邀請香港精算學會就「技術報告 (九): “Technical Report on Actuarial Projections (English Version Only)” 的初稿提出具體意見及提議。香港精算學會為此成立工作小組以檢視此技術報告的一般內容（詳細計算及計算機程式除外），並為團隊提供多項具建設性的意見及建議。團隊在修訂該技術報告時已審慎參考香港精算學會工作小組意見，並在可能的情況下，將其意見歸納於報告之修訂文內。研究團隊亦就香港精算學會工作小組的其他意見加以說明並納入於此最終版本報告的原因及列出本報告的限制。研究團隊在此澄清這並不代表香港精算學會贊同此報告中提出的結果、意見和建議。研究團隊衷心感謝香港精算學會工作小組之幫忙。
Team had revised the technical report by taking considerations of the ASHK Workgroup's comments. Where the ASHK Workgroup's comments have not been incorporated in the final version of this technical report, the Research Team had underscored the limitations and reasons of not incorporating those comments. For clarification, this statement is not an indication that the ASHK is endorsing the results, comments and recommendations made in this report. The Research Team is grateful to the contributions from the ASHK Workgroup.
Summary of Key Assumptions

1 This section summarizes the key assumptions adopted in this technical report. Some proposal-specific or chapter-specific assumptions will be described in the relevant Chapters. Although the demographic and economic assumptions have been developed using the available information, the resulting estimates should be interpreted with caution. These estimates are not intended to be predictions, but rather projections of the future status of the proposals for discussion purpose.

Demographic Assumptions

2 According to the Hong Kong Census and Statistics Department (CSD) the estimate of the Hong Kong Resident Population was 6,869,700 (excluding Foreign Domestic Helpers) at mid-2013, the following table presents the CSD projected population of Hong Kong for selected age groups and years, by gender, from 2014 to 2041.

<table>
<thead>
<tr>
<th>Year</th>
<th>Male 0-19</th>
<th>Male 20-64</th>
<th>Male 65+</th>
<th>Male Total</th>
<th>Female 0-19</th>
<th>Female 20-64</th>
<th>Female 65+</th>
<th>Female Total</th>
<th>Hong Kong Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>616 700</td>
<td>2 230 200</td>
<td>495 100</td>
<td>3 342 000</td>
<td>573 400</td>
<td>2 445 300</td>
<td>568 300</td>
<td>3 587 000</td>
<td>6 929 000</td>
</tr>
<tr>
<td>2015</td>
<td>609 200</td>
<td>2 228 500</td>
<td>519 400</td>
<td>3 357 100</td>
<td>564 700</td>
<td>2 463 000</td>
<td>595 800</td>
<td>3 623 500</td>
<td>6 980 000</td>
</tr>
<tr>
<td>2016</td>
<td>602 300</td>
<td>2 226 700</td>
<td>542 400</td>
<td>3 371 400</td>
<td>556 500</td>
<td>2 480 600</td>
<td>622 100</td>
<td>3 659 200</td>
<td>7 020 600</td>
</tr>
<tr>
<td>2017</td>
<td>598 000</td>
<td>2 224 500</td>
<td>565 000</td>
<td>3 387 500</td>
<td>551 400</td>
<td>2 496 400</td>
<td>649 600</td>
<td>3 697 400</td>
<td>7 064 900</td>
</tr>
<tr>
<td>2018</td>
<td>596 700</td>
<td>2 217 900</td>
<td>588 000</td>
<td>3 402 600</td>
<td>549 200</td>
<td>2 508 300</td>
<td>677 300</td>
<td>3 734 800</td>
<td>7 137 400</td>
</tr>
<tr>
<td>2019</td>
<td>597 300</td>
<td>2 203 900</td>
<td>614 600</td>
<td>3 415 800</td>
<td>549 600</td>
<td>2 512 500</td>
<td>708 600</td>
<td>3 770 700</td>
<td>7 186 500</td>
</tr>
<tr>
<td>2020</td>
<td>598 800</td>
<td>2 186 000</td>
<td>642 900</td>
<td>3 427 700</td>
<td>550 700</td>
<td>2 513 800</td>
<td>741 200</td>
<td>3 805 700</td>
<td>7 233 400</td>
</tr>
<tr>
<td>2021</td>
<td>600 300</td>
<td>2 165 900</td>
<td>673 600</td>
<td>3 439 800</td>
<td>552 100</td>
<td>2 511 700</td>
<td>777 000</td>
<td>3 840 800</td>
<td>7 280 600</td>
</tr>
<tr>
<td>2022</td>
<td>608 700</td>
<td>2 137 600</td>
<td>705 700</td>
<td>3 452 000</td>
<td>559 300</td>
<td>2 505 600</td>
<td>814 600</td>
<td>3 879 500</td>
<td>7 331 500</td>
</tr>
<tr>
<td>2023</td>
<td>616 400</td>
<td>2 108 200</td>
<td>739 100</td>
<td>3 463 700</td>
<td>565 800</td>
<td>2 497 000</td>
<td>855 000</td>
<td>3 917 800</td>
<td>7 381 500</td>
</tr>
<tr>
<td>2029</td>
<td>633 600</td>
<td>1 951 500</td>
<td>927 000</td>
<td>3 512 100</td>
<td>583 000</td>
<td>2 437 800</td>
<td>1 109 700</td>
<td>4 130 500</td>
<td>7 642 600</td>
</tr>
<tr>
<td>2035</td>
<td>589 600</td>
<td>1 908 400</td>
<td>1 027 600</td>
<td>3 525 600</td>
<td>547 800</td>
<td>2 438 800</td>
<td>1 327 000</td>
<td>4 313 600</td>
<td>7 839 200</td>
</tr>
<tr>
<td>2041</td>
<td>565 900</td>
<td>1 881 600</td>
<td>1 065 600</td>
<td>3 513 100</td>
<td>525 800</td>
<td>2 450 500</td>
<td>1 492 000</td>
<td>4 468 300</td>
<td>7 981 400</td>
</tr>
</tbody>
</table>

3 The next Table shows the variations in the relative proportions of various age groups for Hong Kong throughout the projection period. The proportion of residents in Hong Kong aged 65 and over is expected to increase significantly
from 15.3% of the total population in 2014 to 32.0% by 2041. The number of people aged 65 and older as a proportion of the number of people aged 20 to 64 increases more than 150% over the same period, from 22.7% in 2014 to 59.0% by 2041. These proportions highlight the projected trend of ageing in Hong Kong.

<table>
<thead>
<tr>
<th>Year</th>
<th>0-19</th>
<th>20-64</th>
<th>65+</th>
<th>% of Total Population (Male+Female)</th>
<th>Age 65+ as % of Age 20-64</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>17.2%</td>
<td>67.5%</td>
<td>15.3%</td>
<td></td>
<td>22.7%</td>
</tr>
<tr>
<td>2015</td>
<td>16.8%</td>
<td>67.2%</td>
<td>16.0%</td>
<td></td>
<td>23.8%</td>
</tr>
<tr>
<td>2016</td>
<td>16.5%</td>
<td>67.0%</td>
<td>16.6%</td>
<td></td>
<td>24.7%</td>
</tr>
<tr>
<td>2017</td>
<td>16.2%</td>
<td>66.6%</td>
<td>17.1%</td>
<td></td>
<td>25.7%</td>
</tr>
<tr>
<td>2018</td>
<td>16.1%</td>
<td>66.2%</td>
<td>17.7%</td>
<td></td>
<td>26.8%</td>
</tr>
<tr>
<td>2019</td>
<td>16.0%</td>
<td>65.6%</td>
<td>18.4%</td>
<td></td>
<td>28.1%</td>
</tr>
<tr>
<td>2020</td>
<td>15.9%</td>
<td>65.0%</td>
<td>19.1%</td>
<td></td>
<td>29.5%</td>
</tr>
<tr>
<td>2021</td>
<td>15.8%</td>
<td>64.2%</td>
<td>19.9%</td>
<td></td>
<td>31.0%</td>
</tr>
<tr>
<td>2022</td>
<td>15.9%</td>
<td>63.3%</td>
<td>20.7%</td>
<td></td>
<td>32.7%</td>
</tr>
<tr>
<td>2023</td>
<td>16.0%</td>
<td>62.4%</td>
<td>21.6%</td>
<td></td>
<td>34.6%</td>
</tr>
<tr>
<td>2029</td>
<td>15.9%</td>
<td>57.4%</td>
<td>26.6%</td>
<td></td>
<td>46.4%</td>
</tr>
<tr>
<td>2035</td>
<td>14.5%</td>
<td>55.5%</td>
<td>30.0%</td>
<td></td>
<td>54.2%</td>
</tr>
<tr>
<td>2041</td>
<td>13.7%</td>
<td>54.3%</td>
<td>32.0%</td>
<td></td>
<td>59.0%</td>
</tr>
</tbody>
</table>

The projected labour force participation rate data by sex and age group from 2013 to 2041 have been provided by the Census and Statistics Department. The projected labour force data by sex and age group from 2013 to 2041 have been provided by the Census and Statistics Department. The historical unemployment rate data by sex and age group from 1982 to 2013 have been provided by the Census and Statistics Department. The average rates in this period will be used for the assumption of future unemployment rates. The projected population with employment (excluding foreign domestic helpers) by sex and selected age groups from 2013 to 2041 estimated by the Research Team can be summarized in the following two tables:
<table>
<thead>
<tr>
<th>Year</th>
<th>15-19</th>
<th>20-29</th>
<th>30-39</th>
<th>40-49</th>
<th>50-59</th>
<th>60-64</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>14.6</td>
<td>326.8</td>
<td>427.3</td>
<td>464.1</td>
<td>501.5</td>
<td>130.4</td>
</tr>
<tr>
<td>2015</td>
<td>13.2</td>
<td>325.2</td>
<td>426.1</td>
<td>457.0</td>
<td>506.7</td>
<td>138.0</td>
</tr>
<tr>
<td>2016</td>
<td>12.0</td>
<td>323.7</td>
<td>427.3</td>
<td>450.8</td>
<td>503.8</td>
<td>146.0</td>
</tr>
<tr>
<td>2017</td>
<td>10.6</td>
<td>323.1</td>
<td>425.0</td>
<td>448.2</td>
<td>495.2</td>
<td>154.0</td>
</tr>
<tr>
<td>2018</td>
<td>9.6</td>
<td>318.6</td>
<td>425.5</td>
<td>443.3</td>
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</tr>
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<td>397.7</td>
<td>424.9</td>
<td>369.2</td>
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<td>423.5</td>
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<td>426.0</td>
<td>381.1</td>
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<tr>
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<td>93.8</td>
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<td>2021</td>
<td>9.1</td>
<td>290.9</td>
<td>431.9</td>
<td>426.6</td>
<td>388.4</td>
<td>97.9</td>
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<tr>
<td>2022</td>
<td>9.1</td>
<td>282.1</td>
<td>436.2</td>
<td>429.1</td>
<td>389.4</td>
<td>101.2</td>
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<tr>
<td>2023</td>
<td>9.3</td>
<td>272.4</td>
<td>438.4</td>
<td>432.5</td>
<td>386.8</td>
<td>106.5</td>
</tr>
<tr>
<td>2029</td>
<td>10.7</td>
<td>232.4</td>
<td>430.8</td>
<td>476.9</td>
<td>372.4</td>
<td>115.4</td>
</tr>
<tr>
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<td>8.7</td>
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<td>376.2</td>
<td>498.7</td>
<td>389.7</td>
<td>124.2</td>
</tr>
<tr>
<td>2041</td>
<td>7.9</td>
<td>279.7</td>
<td>381.7</td>
<td>475.3</td>
<td>428.4</td>
<td>128.3</td>
</tr>
</tbody>
</table>

**Economic Assumptions**

5 The Research Team adopts the price inflation assumptions and real GDP growth assumptions as employed by the Working Group on Long-Term Fiscal Planning (LTFP WG). These assumptions are summarised in the following Table:
6 Real rate of investment return after administrative charges on retirement funds is assumed to be 2% per year. It is a rounded figure from the difference between the assumed nominal long-term investment rate of return for the Hong Kong Exchange Fund (5%) by the LTFP WG and the assumed average annual price inflation (3.1%) per year during the projection period.

7 The projected total government expenditure, government surplus/deficit for the study period 2013-41 under the "Base/Low/High Case - No Service Enhancement" scenarios are kindly provided by LTFP WG.

Real Wage Increases, Real Income Distributions and Contribution Evasion Rates

8 Future real wage growth rates (by age, gender and income level), income distribution (by age and gender) and contribution evasion rates among the Hong Kong population are three significant assumptions for this type of projection study. They are key factors of projecting pension wealth in the replacement rate study, as well as determining contributions into the Universal Pension Fund (UPF) as described in the main report.

9 The income distributions by sex and age group in 2013 have been compiled from the 2013 Annual Earnings and Hours Survey (AEHS) by the Census and Statistics Department. The data have been kindly made available to the Research Team. The data are categorised by sex (two groups: male and female), age (six groups: 15-19, 20-29, 30-39, 40-49, 50-59, 60-64), income

<table>
<thead>
<tr>
<th>Year</th>
<th>Real GDP Growth Rate</th>
<th>Inflation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Base</td>
<td>Low</td>
</tr>
<tr>
<td>2014</td>
<td>3.5%</td>
<td>3.5%</td>
</tr>
<tr>
<td>2015-2018</td>
<td>3.5%</td>
<td>3.5%</td>
</tr>
<tr>
<td>2019-2021</td>
<td>3.5%</td>
<td>3.0%</td>
</tr>
<tr>
<td>2022-2025</td>
<td>3.0%</td>
<td>2.5%</td>
</tr>
<tr>
<td>2026-2041</td>
<td>2.5%</td>
<td>2.0%</td>
</tr>
</tbody>
</table>
(14 monthly wage groups: ≤6500, 6500-10000, 10000-15000, 15000-20000, .., 90000-100000, ≥100000). In each cell, both frequency and median monthly wage amount are available.

10 It should be noted that the evolution of real income distribution in the future depends on many factors. For example, changes in the social structure among the population, such as ageing trend (coupled with people retiring later) would make career progression of youngster slower, affecting the income distribution in the future. Furthermore, patterns of future real wage changes (by sex and gender) would also affect the corresponding cells in the income distribution in the future. It would be a nontrivial task to develop a labour econometric model to project the dynamic evolution of real income distributions in Hong Kong from 2014 to 2041.

11 The wage inflation is normally above the price inflation in Hong Kong before year 2000. The average differential (real wage growth) is 1.1% per annum for the period 1983-2012 (30 years), 1.0% per year for 1988 to 2012 (25 years), 0.8% per year for 1993-2012 (20 years), 1.0% for the period 1998-2012 (15 years). The above figures are taken from the Report of LTFP WG.

12 Using the year-on-year percentage change of the Nominal Wage Index (NWI) published by the Census and Statistics Department, the Research Team further calculates the real wage growth for the period 2004-2013 (10 years), the result is 0.1% per year. Six (out of ten) years in this period experience a real wage decrease. The 2013 real wage growth is -0.2% per annum.

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9 For some cells, data are missing due to extremely small number of observations. The Research Team imputed back the numbers using simple linear interpolation method. Since the numbers of data in these cells are very small, it would not have significant impacts on the shape of the overall distribution.

10 Nominal Wage Index measures the pure changes in wage rates of employees up to supervisory level (that is, managerial and professional employees are not included) by holding constant the structure of the labour force with respect to industry, occupation and sex between two successive rounds of the survey. The Research Team uses the end of year “all selected industries” NWI figures and end of year Composite CPI index for calculations.
Possible factors that contribute to the low level of average real wage growth rate in the last ten years include economic impacts from the Global Financial Crisis 2007-08 and the 2002-03 outbreak of severe acute respiratory syndrome (SARS).

The real wage increase in Hong Kong has fluctuated significantly from year to year. The sample standard deviation (volatility) is 2% per year for the 31-year period ending in 2013. It is fairly difficult to predict the future path of real wage changes in Hong Kong for the next 29 years.

Evasion of social security contributions are not uncommonly seen in many countries, Hong Kong might not be an exception, particularly in respect of those who are self-employed. Ignoring the effect of contribution evasion would cause over-estimation of the contribution receipts.

There are not many economic studies in the literature on contribution evasion. One of them provides estimations on the size of the evasion rate for selected OECD countries in year 2000. The evasion rate is defined as one minus the ratio of actual contribution receipts to theoretical liability to compulsory employee and employer social security contributions in the non-government sector. The results are ranging from 2% in Czech Republic to 55% in Mexico.

It is difficult to estimate the future rates of UPF contribution evasion in Hong Kong for the next 29 years.

For the projection purpose in this study only, the Research Team makes the following working assumptions: (i) The wage changes in Hong Kong during the projection period will match exactly the corresponding price inflation rate.

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in that year, i.e., there is no real wage growth; (ii) Furthermore, we assume that the real income distributions (i.e., in 2013 constant dollars) obtained from the 2013 AEHS will remain constant in future; and (iii) The contribution evasion rates in Hong Kong are negligible.

The first assumption would likely cause under-estimation of contributions to the UPF; while the third assumption would likely cause over-estimation of contributions to the UPF. Some of these adverse effects are expected to be offsetting in the overall estimation of contributions.

The assumed age-gender specific real income distributions that will be used in this study are plotted in the following charts for selected age groups:
Due to lack of data and expertise, the Research Team makes the above three assumptions in a holistic manner. It is recommended that the Government should engage relevant experts to refine these assumptions in the next stage.

**Contribution Requirements for the Universal Pension in P1, P2 and P3**

The contribution requirements for the universal pension in P1, P2 and P3 have not been unambiguously defined in the proposals. All proposals set the contribution requirements by referencing to the MPF system. But in reality, only about 72% are covered under MPF schemes (some of them are self-employed persons) while 13% are covered under other retirement schemes, such as Occupational Retirement Schemes Ordinance (ORSO). Others include those who are not required to join any local retirement schemes.

Since it is assumed that the eligibility requirements for the universal pension do not preclude any members from ORSO or other retirement schemes, the Research Team makes the following working assumption in order to provide a common ground to compare various proposals: All employed persons aged between 18 and 64 and their employers have to pay UPF contributions as they were in the MPF system.

Furthermore, it is assumed that the current offsetting mechanism of employees’ severance payments or long service payments under the MPF system will not be applicable to UPF contributions.

**Eligibility Requirements for the Universal Pension in P1, P2 and P3**

The eligibility requirements for the universal pension in P1, P2 and P3 have not been unambiguously defined in the proposals. Differing entitlements to benefits will have a significant impact on the sustainability study (Chapter 3) of various proposals. For example, are domestic helpers eligible for the benefits
should they retire in Hong Kong? What about Hong Kong elderlies moving to China (or overseas) after retirement? Should there be a minimum residency requirement to become eligible to the benefits?

Restricted by the availability of data and in order to provide a common ground to compare various proposals, the Research Team makes a working assumption that all individuals aged 65+ of the “resident population\textsuperscript{12}” (excluding foreign domestic helpers) projected by the CSD from 2013 to 2041 are eligible for the benefits in P1, P2 and P3. All eligible 65+ elderlies will take up the benefits.

\textsuperscript{12} For details of the “resident population” method, readers may refer to the feature article entitled “Compiling Population Estimates of Hong Kong” published in the February 2002 issue (pages FD1-FD13) of the Hong Kong Monthly Digest of Statistics published by the CSD.
Chapter 1: Projection for Government

Expenditure on Existing Social Security Schemes for Elderly in Hong Kong from Year 2013 to 2041

Overview

1.1 In this chapter, government expenditure on existing social security schemes for elderly in Hong Kong from Year 2013 to 2041 is projected, serving as our baseline. The underlying projection approach and assumptions used in the projection are also listed. As for the purpose of sensitivity testing, the expenditure is also projected under different growth and price scenarios.

Existing social security schemes for elderly in Hong Kong

1.2 The projection covers the following Social Security Schemes for elderly in Hong Kong:

- Comprehensive Social Security Assistance (CSSA),
- Old Age Living Allowance (OALA),
- Old Age Allowance (OAA),
- Normal Disability Allowance (NDA) and
- Higher Disability Allowance (HDA).

1.3 Recipients cannot receive allowance from more than one scheme. Except for Comprehensive Social Security Assistance and Old Age Living Allowance, allowances from the other schemes are non-means-tested.13

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13 Eligibility details of each scheme can be found in Appendix 1.
Methodology, data and assumptions

1.4 The aggregated amount of government expenditure per year is determined by first deriving the projected number of recipients under difference schemes. The basis is aged 65 or above population projection, multiplied by estimated take-up rates of different schemes of the corresponding years. The derived projected numbers of recipients of different schemes are then multiplied to the allowance rates of the corresponding schemes.

Population Projection

1.5 Aged 65 or above population projection used here is consistent with those employed by the Working Group on Long-Term Fiscal Planning.

Chart 1.1 – Aged 65 or above population projection

Take-up rate assumptions

1.6 Recipients cannot receive allowance from more than one scheme, i.e. the scheme coverage is mutually exclusive.
1.7 Historical take-up rates from 1996 to 2013 for CSSA, OALA\textsuperscript{14}, NDA, HDA, OAA of these two age groups (65-69 & 70+) have kindly been provided to the Research Team by the Social Welfare Department. The take-up rates are then combined to get the take-up rates of each programme for the single group (65+).

1.8 The upper portion of the following table shows the historical mid-year take-up rates for selected years from 1996 to 2013 of various programmes:

<table>
<thead>
<tr>
<th>Year</th>
<th>CSSA</th>
<th>OALA</th>
<th>NOAA</th>
<th>NDA</th>
<th>HDA</th>
<th>OAA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>13.6%</td>
<td>-</td>
<td>21.6%</td>
<td>3.2%</td>
<td>1.0%</td>
<td>44.4%</td>
<td>83.9%</td>
</tr>
<tr>
<td>2001</td>
<td>18.0%</td>
<td>-</td>
<td>16.5%</td>
<td>4.8%</td>
<td>1.2%</td>
<td>43.8%</td>
<td>84.3%</td>
</tr>
<tr>
<td>2006</td>
<td>19.2%</td>
<td>-</td>
<td>9.6%</td>
<td>5.0%</td>
<td>1.2%</td>
<td>44.5%</td>
<td>79.5%</td>
</tr>
<tr>
<td>2009</td>
<td>17.9%</td>
<td>-</td>
<td>7.8%</td>
<td>5.1%</td>
<td>1.3%</td>
<td>46.4%</td>
<td>78.4%</td>
</tr>
<tr>
<td>2010</td>
<td>17.4%</td>
<td>-</td>
<td>7.6%</td>
<td>5.0%</td>
<td>1.3%</td>
<td>46.7%</td>
<td>78.0%</td>
</tr>
<tr>
<td>2011</td>
<td>16.8%</td>
<td>-</td>
<td>7.6%</td>
<td>4.9%</td>
<td>1.3%</td>
<td>46.5%</td>
<td>77.1%</td>
</tr>
<tr>
<td>2012</td>
<td>16.0%</td>
<td>-</td>
<td>7.9%</td>
<td>4.9%</td>
<td>1.4%</td>
<td>45.5%</td>
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<tr>
<td>2013</td>
<td>15.1%</td>
<td>33.5%</td>
<td>-</td>
<td>3.1%</td>
<td>1.3%</td>
<td>22.5%</td>
<td>75.4%</td>
</tr>
</tbody>
</table>

1.9 The take-up rates for HDA have been fairly stable in the past. The Research Team assumes that the rate will increase very slowly from 1.3% in 2014 to 1.7% in 2041 due to population ageing.

\textsuperscript{14} OALA was only launched in April 2013; before 2013, the take-up rate figures of the Normal OAA (NOAA) programme are also given.
1.10 After the introduction of OALA scheme in 2013, the take-up rate of NDA is expected to slide down significantly due to the difference of benefit amounts of these two programmes (OALA: $2,200 per month in 2013, while NDA: $1,450 per month). Recipients of NDA scheme who are able to meet the income and asset requirements will likely switch to the OALA scheme. The Research Team assumes that the NDA take-up rate will further drop from 3.1% in 2013 to 1.8% in 2014, 1.1% in 2015 and then stabilize at around 0.8% in 2016. The rate will increase very slowly from 0.8% in 2017 to 0.9% in 2041 due to population ageing.

1.11 The take-up rate for the newly introduced OALA programme in June 2013 is 33.5%. It should be noted that OALA is a scheme with means test for 65+; the previous means-tested NOAA is for 65-69, and higher OAA is non-means-tested for 70+. It is expected that all previous NOAA recipients will transfer to the OALA scheme; while previous recipients (age 70+) of OAA scheme who are able to pass the income/assets test will likely switch to the OALA scheme. The Research Team assumes that the transition will be completed in the next two to three years. The take-up rate for OALA will stabilize at around 31% for recipients aged 65-69, and around 42% for 70+. Weighted these two assumptions by the projected population in the corresponding age group, the OALA take-up rate for 65+ is assumed to narrowly fluctuate at around 40%.

1.12 The CSSA take-up rates for 65+ have been slowly moving down from its peak (19.4% in 2005) to the recent rate of 15.1% (9.5% for aged 60-64 and 17.4% for 70+) in 2013, possibly due to the effects of MPF system which was first introduced in 2000. However, most elderly CSSA recipients are likely low-income earners and their MPF savings may just defer them from taking CSSA to an older age. The Research Team assumes that the CSSA take-up rate for recipients aged 65-69 will continue to move down from 9.5% in 2013 to 7.5% in 2025, and then flat thereafter. The CSSA take-up rate for aged 70+ will continue to move down from 17.4% in 2013 to 15.1% in 2030, and then rebound back to 19.3% in 2041. Weighted these two assumptions by the projected population in the corresponding age group, the CSSA take-up rate for
65+ will be moving down from 14.5% in 2014 to 12.8% in 2026, and climb up slowly to 16.9% in 2041.

1.13 It is expected that the take-up rates for the OAA programme will have a structural change after the introduction of OALA scheme in 2013. The Research Team assumes that the overall take-up rates for all five programmes will be stationary at around 40% for aged 65-69 and 88% for aged 70+ recipients. The OAA take-up rates can then be computed as a balance item.

1.14 The assumed take-up rates for all programmes are shown in the lower panel of the Table in paragraph 1.8.

1.15 Two additional scenarios, namely LOW and HIGH scenarios, are also assumed to illustrate the government expenditure projection under different growth and price scenarios.

1.16 For LOW scenario, the lower take-up rates can be led by higher/better economic growth environment. Similarly, for HIGH scenario, the higher take-up rates can be led by lower/ slower economic growth environment. These scenarios have been determined using similar steps as those in the BASE scenario.
Chart 1.2 – Projected take-up rates of existing Social Security Schemes for Elderly (Base Scenario)

Chart 1.3 – Projected take-up rates of existing Social Security Schemes for Elderly (Low Scenario)
Allowance rates per recipient under different schemes

1.17 For NDA, HDA and OAA, which are schemes with standard payment, the standard amounts effective from February 2013 are used.

1.18 The OALA programme was introduced in April 2013, and its standard rate effective from April 2013 is used.

1.19 There is no “standard payment” under CSSA. Instead, CSSA payments vary according to recipients’ family composition, recognised needs and family income, etc. The average rate for CSSA is determined by the estimated total CSSA payment for elderly recipients aged 65 and above in 2012-13, divided by the corresponding number of elderly recipients aged 65 and above.
Table 1.1 – Annualized rates per recipient under different schemes

<table>
<thead>
<tr>
<th>Social Security Schemes for Elderly</th>
<th>Annualized Rate per recipient (HK$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NDA</td>
<td>17,400</td>
</tr>
<tr>
<td>HDA</td>
<td>34,800</td>
</tr>
<tr>
<td>OAA</td>
<td>13,620</td>
</tr>
<tr>
<td>OALA</td>
<td>26,400</td>
</tr>
<tr>
<td>CSSA</td>
<td>55,464</td>
</tr>
</tbody>
</table>

**Inflation**

1.20 It is assumed that the standard rates would be adjusted exactly in line with price inflation in future, i.e. no change in real terms.

1.21 In real terms, the same rates per recipient are used for all projection years. In nominal terms, the rates per recipient are adjusted by inflation. The inflation rate would be adjusted under HIGH and LOW scenarios when expressing the expenditure in nominal terms. The projected inflation rates are consistent with those employed by the Working Group on Long-Term Fiscal Planning.

**Total Nominal GDP**

1.22 The projected government expenditure on elderly social security schemes is also expressed as a percentage of total nominal GDP.
Projection results

1.23 Table 1.2 shows the projected government expenditure on Elderly Social Security Schemes at nominal prices and 2013 constant prices under the Base scenario. The projected nominal values are also expressed as a percentage of projected nominal GDP for that year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Billions at Nominal Prices</th>
<th>Billions at 2013 Prices</th>
<th>% of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>21.72</td>
<td>21.72</td>
<td>1.00%</td>
</tr>
<tr>
<td>2014</td>
<td>23.79</td>
<td>22.94</td>
<td>1.10%</td>
</tr>
<tr>
<td>2015</td>
<td>25.45</td>
<td>23.71</td>
<td>1.10%</td>
</tr>
<tr>
<td>2016</td>
<td>27.15</td>
<td>24.44</td>
<td>1.10%</td>
</tr>
<tr>
<td>2021</td>
<td>38.71</td>
<td>29.77</td>
<td>1.20%</td>
</tr>
<tr>
<td>2031</td>
<td>79.04</td>
<td>45.23</td>
<td>1.60%</td>
</tr>
<tr>
<td>2041</td>
<td>138.9</td>
<td>59.14</td>
<td>2.00%</td>
</tr>
</tbody>
</table>

1.24 Table 1.3 presents the results under the Low take-up rate scenario. It should be noted that the projected nominal expenditure in 2041 in Table 1.3 is higher than the corresponding value in Table 1.2. It is because the lower take-up rate scenario is assumed to be led by higher economic growth environment (hence, higher inflation rate assumption).

<table>
<thead>
<tr>
<th>Year</th>
<th>Billions at Nominal Prices</th>
<th>Billions at 2013 Prices</th>
<th>% of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>21.72</td>
<td>21.72</td>
<td>1.00%</td>
</tr>
<tr>
<td>2014</td>
<td>23.50</td>
<td>22.66</td>
<td>1.10%</td>
</tr>
<tr>
<td>2015</td>
<td>25.07</td>
<td>23.36</td>
<td>1.10%</td>
</tr>
<tr>
<td>2016</td>
<td>26.66</td>
<td>24.00</td>
<td>1.10%</td>
</tr>
<tr>
<td>2021</td>
<td>37.81</td>
<td>28.66</td>
<td>1.20%</td>
</tr>
<tr>
<td>2031</td>
<td>80.13</td>
<td>43.05</td>
<td>1.50%</td>
</tr>
<tr>
<td>2041</td>
<td>147.3</td>
<td>56.11</td>
<td>1.70%</td>
</tr>
</tbody>
</table>
1.25 Table 1.4 gives the results under the High take-up rate scenario.

<table>
<thead>
<tr>
<th>Year</th>
<th>Billions at Nominal Prices</th>
<th>Billions at 2013 Prices</th>
<th>% of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>21.72</td>
<td>21.72</td>
<td>1.00%</td>
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<tr>
<td>2014</td>
<td>24.21</td>
<td>23.35</td>
<td>1.10%</td>
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<tr>
<td>2015</td>
<td>26.08</td>
<td>24.30</td>
<td>1.10%</td>
</tr>
<tr>
<td>2016</td>
<td>27.98</td>
<td>25.18</td>
<td>1.10%</td>
</tr>
<tr>
<td>2021</td>
<td>40.13</td>
<td>31.31</td>
<td>1.30%</td>
</tr>
<tr>
<td>2031</td>
<td>78.61</td>
<td>47.92</td>
<td>1.90%</td>
</tr>
<tr>
<td>2041</td>
<td>129.88</td>
<td>61.85</td>
<td>2.30%</td>
</tr>
</tbody>
</table>

1.26 Chart 1.5 plots the projected government expenditure on Elder Social Security Schemes at nominal prices under the Base scenario. It is also expressed in terms of percentage of projected Total Nominal GDP.

*Chart 1.5 – Projected Government Expenditure on Existing Elderly Social Security Schemes (at nominal price, as percentage of Projected Total Nominal GDP)*
Analysis and Limitations

Main Findings

1.27 Under the Base Scenario the projected total government expenditure (in 2013 constant dollar) on existing social security schemes for elderly (65+) in Hong Kong increases from $21.72 billion in 2013 to $59.14 billion in 2041, approximately a 170% increase during the period. The increase is largely due to the growth of elderly population in Hong Kong. If we express the projected nominal expenditure as a percentage of projected nominal government expenditure, the result is expected to increase roughly from 5% in 2013 to 8% in 2041. Furthermore, if we express the projected nominal amount as a percentage of projected nominal GDP, the results are 1% in 2013 and 2% in 2041.

Sensitivity

1.28 Under HIGH (higher take-up rates under slower economic growth environment) and LOW (lower take-up rates under better economic growth environment) scenarios, the corresponding expenditure on elderly social security schemes is shown in Chart 1.6. For better comparison across scenarios, the expenditure is expressed in real terms, removing the impact from different inflation rates under the scenarios.

1.29 Similarly, it is also expressed in nominal terms and compared with total nominal GDP in Chart 1.7
Chart 1.6 – Projected Government Expenditure on Existing Elderly Social Security Schemes (at constant price with basis year 2013)

Projected Government Expenditure on Existing Elderly Social Security Schemes (at constant price with basis year 2013)

Expenditure ($ billions)

Projection Year

BASE Scenario
LOW Scenario
HIGH Scenario

Chart 1.7 – Projected Government Expenditure on Existing Elderly Social Security Schemes (at nominal price, as percentage of Projected Total Nominal GDP)

Projected Government Expenditure on Elderly Social Security Schemes (at nominal price, as percentage of Projected Total Nominal GDP)

% of Projected Total Nominal GDP

Projection Year

BASE Scenario
LOW Scenario
HIGH Scenario
Limitations

1.30 There are many factors that would affect the take-up rates in the future. The Research Team has to make the take-up rate assumptions in this Chapter based on limited data and information. Any significant changes in take-up behaviour would possibly alter the projected number of recipients, and hence the expenditure amount.

1.31 The allowance rates for CSSA are different for recipients with different background and health condition. Without detailed data, a rough method was used to estimate the representative average expenditure per CSSA elderly recipient. Should the CSSA payment amount distribution be highly skewed, it may affect the projection results.
Chapter 2: Adequacy: The Retirement Income Replacement Rate Approach

Background

2.1 Adequacy refers to both the absolute level (preventing old-age poverty) as well as the relative level (replacing sufficient lifetime earnings) of retirement income that the pension system will provide\textsuperscript{15}.

2.2 Components of a pension system (which will be used to generate retirement income for individuals) can be classified according to the World Bank’s Five-Pillar Pension Taxonomy\textsuperscript{16}:

- The non-contributory “zero pillar” (Pillar\textsuperscript{0}) – in form of social pension, or general social assistance typically financed by the government, covering universal or residual population. It is often used to provide all of the elderly with a minimal safety net of protection.

- The mandatory “first pillar” (Pillar\textsuperscript{1}) – public pension plans with contributions linked to varying degrees to earnings of individuals, companies or the government. The objective is to replace some portion of lifetime pre-retirement income.

- The mandatory “second pillar” (Pillar\textsuperscript{2}) – in form of occupational or personal plans, could be fully funded defined benefit schemes or fully funded defined contribution plans. The main characteristic of this pillar is that assets and investment in the plans are privately managed. The role of Pillar\textsuperscript{1} and Pillar\textsuperscript{2} is to provide modest pensions for individuals.

\textsuperscript{15} Supra, note 4, page 55.
\textsuperscript{16} Supra, note 4, page 82.
• The voluntary “third pillar” (Pillar 3) – any privately managed occupational or personal plans, which are essentially flexible and discretionary in nature. The role of Pillar 3 is to enhance the pension accumulations and encourage individuals and companies to save for more generous benefits.

• The informal “fourth pillar” (Pillar 4) – informal support from children and relatives, and other formal social programs (such as health care vouchers and transportation allowances).

**Retirement-Income Indictors**

2.3 The retirement-income replacement rate, relatively expressed as a percentage of earnings, is commonly employed to determine to what degree of living standards are sustained over retirement. It is a measure of the income that a territory’s pension system seeks to provide to its retired residents and is computed using the own pension system rules of the country. The replacement rate can express adequacy from an individual perspective, i.e. related to a person’s previous earnings; or from a societal perspective –– related to average (or median) economy-wide earnings.

2.4 This technical report adopts the OECD terminology for defining replacement rates17.

2.5 **Replacement Rate** shows the value of the pension for specific individuals as a percentage of their own earnings when working. These rates are given in gross and net terms, taking account of taxes and contributions paid on earnings and on retirement incomes.

2.6 **Relative Pension Level** shows the value of the pension for specific individuals as a percentage of the economy-wide median (or average) earnings. These rates are also given in gross and net terms.

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17 *Supra*, note 5, page 23.
2.7 It seems that there is no single universally accepted definition of what an adequate pension level should be or what constitutes an adequate retirement income in a broader sense\textsuperscript{18}. The Research Team will not attempt to define the adequacy of pensions in Hong Kong. Instead, in this chapter, various replacement rate indicators are computed using the modified OECD model with Hong Kong assumptions for different pension reform proposals. The results for $P_0$ (status quo) will also be computed for comparison purpose.

**The Model**

2.8 The Research Team modifies the basic form of the OECD pension model\textsuperscript{19} for the calculation of Hong Kong replacement rates under different proposed pension reform system.

2.9 The OECD pension model provides an analysis of pension entitlements and it is forward looking in the sense that they relate to workers entering the labour market today and retires after a full career. Therefore, the analysis illustrates the full impact of each pension reform proposal.

2.10 The economic and other model assumptions employed in the calculation of replacement rates in OECD report for Asia/Pacific are rather board and general\textsuperscript{20}. The OECD study is a “microeconomic” one looking at prospective individual entitlements under all 21 of the economies pension regimes. In this report, the Research Team set the assumptions using Hong Kong specific data and information. These **baseline assumptions** are listed as follow:

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\textsuperscript{19} The relevant methodology of the OECD pension model is briefly described in OECD (2013) _Pensions at a Glance Asia/Pacific 2013_, pages 17-19.

\textsuperscript{20} Supra, note 10.
**Model Assumptions**

- Seven sample points (multiples of 0.5, 0.75, 1.0, 1.5, 2.0, 3.0, and 5.0 of individual median earnings) are considered in the replacement rate calculations.

- Eight sample points (multiples of 0.0, 0.5, 0.75, 1.0, 1.5, 2.0, 3.0, and 5.0 of individual median earnings) are considered in the relative pension level calculations.

**Economic Assumptions**

- The median income per month in Hong Kong as of June 2013 is HK$15,000 (MEN) and HK$11,500 (WOMEN). Real income is assumed to be fixed over time.

- **Indexation of pension system parameters**: Benefit parameters (e.g., allowance amounts of CSSA, OAA and OALA programs), which are crucial elements in the numerator calculation of the replacement rates, are assumed to be indexed by price inflation in future\(^{21}\). This assumption has been consistently applied throughout this technical report. However, if the median earnings in the denominator are adjusted by wage inflation (instead of price inflation), it will normally lead to a steady decline in benefit value relative to median earnings at today’s prices, and this trend will only continue unless the indexation procedures are changed. The following simple example illustrates this point. The benefit value of the OALA scheme is HK$2,200 per month at 2013 prices; its relative value to female median earnings at 2013 prices is:

\[
\frac{2200}{11500} = 19.1\%.
\]

\(^{21}\) The OECD Pension Model also assumes that benefit amounts of social security programmes in Hong Kong, such as Normal OAA and Higher OAA, are price indexation. See *supra*, note 6, page 52.
• However, if we assume that the numerator is adjusted using price inflation in future, and the denominator is linked to wage inflation in future. For illustrative purpose, consider the net wage inflation is 1% per year, and after 40 years; the above ratio will decline to:

\[
\frac{1200}{11500(1.01)^{40}} = 12.8\%
\]

• Since the purpose of replacement rate calculations in this chapter is to compare different pension proposals in 2013, therefore, for the purpose of this report it has been assumed that both numerator and denominator are linked to prices only. Obviously this assumption has an adverse effect on the results when calculating the component of replacement rate generated by the MPF system in Hong Kong.

• Real rate of return after administrative charges on funded, defined-contribution pensions is 2% per year. It is a rounded figure from the difference between the assumed nominal long-term investment rate of return (5%) and the assumed annual price inflation (3.1%) per year\textsuperscript{22}.

Actuarial Assumptions

• Full career length is 40 years (i.e., entry age is 25 and the retirement age is 65) with interruption rates (out of paid work in unemployment, full-time education, caring for children, disabled or elderly relatives) negative-exponentially related to earnings\textsuperscript{23}. It is assumed that the interruption rates depend only on the level of earnings in 2013, and the estimated rates used in this chapter are:

\textsuperscript{22} The nominal long-term investment rate of return of 5% is analogous to the assumed return rate for the Hong Kong Exchange Fund by the Working Group on Long-Term Fiscal Planning. The Research Team also adopts the price inflation assumption of the Working Group. \textit{Supra}, note 1, para 4.17 and para 2.18, respectively.

\textsuperscript{23} Following the OECD methodology, a negative exponential regression analysis was performed using the most updated Hong Kong data. The interruption rates were estimated from the fitted regression model.
It should be noted that benefits from MPF schemes are paid in a lump sum to the individual at retirement (aged 65). For the purpose of replacement rate calculations, this stock of wealth will be transformed into an immediate lifelong price-indexed stream of income using sex-specific life annuity rates.

Since the assumed real rate of investment return is 2% per year, in order for the hypothetical annuity provider to cover its costs, the real discount rate in the computation of life annuity rates has to be less than 2%. The Research Team does not have any information on pricing price-indexed life annuities in Hong Kong; it is roughly set the real discount rate at 1% per annum, allowing a spread of 100 basis points from the 2% investment return rate.

The Research Team uses the projected life tables for males and females in 2013 provided by the CSD to compute the sex-specific life annuity rates. At the real discount rate of 1%, the rates are 17.3 for men and 21.2 for women. These rates are comparable to the results in another study. However, an individual will only retire after a full-length of career (say, 40 years from now). Theoretically, one should use projected life tables in 2053 and beyond, incorporating possible longevity improvement in the 

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24 The life multiplier for men at 1% discount rate is 18.17 and 22.26 for women at age 65, see Tables 1 and 2 in *Personal Injury Tables Hong Kong 2013*, General Editor: N. Sarony, published by Sweet & Maxwell.
future. Unfortunately, such long range projections of life tables are not available from the CSD. Assuming strictly positive longevity improvement of Hong Kong people aged 65+ in future; the current life table assumptions would likely over-estimate the MPF component in the replacement rate computations.

**Pillar Assumptions**

- **Pillar 0** in Hong Kong: This pillar includes the current CSSA, OALA and OAA schemes; as well as those new amounts proposed in P4 and P5. It is assumed that lower income earners will be qualified to take the scheme with higher benefit amount. For examples, those with zero income will take CSSA after age 65, those with 0.5 or 0.75 multiples of median income during their career time will take OALA after retirement, and those with 1 or higher multiples of median income will take OAA after 65+. The assumptions are summarized in Table 2.1.

- **Pillar 1** in Hong Kong: Hong Kong does not have a mandated contributory public pension plan under the current system. However, the proposed Universal Retirement Pension (URP) allowances in the P1, P2 and P3 are classified as Pillar 1 by the Research Team.

- **Pillar 2** in Hong Kong: The Mandatory Provident Fund (MPF) schemes in Hong Kong belong to this pillar.

- **Pillar 3** in Hong Kong: Voluntary personal savings for retirement and MPF-exempted schemes registered under the Occupational Retirement Schemes Ordinance (ORSO) in Hong Kong belong to this pillar. Following the OECD pension model, this pillar is not included in the computation of retirement-income indicators for Hong Kong.\(^{25}\)

\(^{25}\) Possibly due to lack of information on private retirement savings and voluntary private pensions in Hong Kong. However, OECD suggests the analysis of pension gaps. It illustrates the amount that individuals would
• **Pillar 4** in Hong Kong: It includes Health Care Voucher from the government ($1,000 per year for 70+), Public Transport Fare Concession Scheme for the Elderly (estimated as $500 per year for 65+)\(^{26}\) and informal support from children\(^{27}\).

• A summary of all pillar assumptions for each proposal in calculating the replacement rates are given in Table 2.1.

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\(^{26}\) It is a rough estimate using data given in the Report of the Working Group. *Supra*, note 1, para 3.23(b).

\(^{27}\) The assumed amounts are given in the last row of Table 2.1 of this report. The assumptions for “Children Support” made in Table 2.1 are working assumptions based on judgement by the Research Team. Detailed long-term projections of possible pecuniary support from children in **Pillar 4** require substantial research and comprehensive longitudinal survey data, and such results are not available to the Research Team.
Table 2.1 Summary of pillar assumptions in calculating the replacement rates

<table>
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<th>Multiples of Median Income</th>
<th>0</th>
<th>0.5</th>
<th>.75</th>
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<th>1.5</th>
<th>2</th>
<th>3</th>
<th>5</th>
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<td>OAA (^a) (Pillar 0)</td>
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<td>• P1 工聯會</td>
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<tr>
<td>1,687 (Pillar 0) + 3,250</td>
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<td>• P2 爭取全民退保聯席</td>
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<td>• P3 公共專業聯盟</td>
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<td>OAA (Pillar 0)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>OAA (Pillar 0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>OAA (Pillar 0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OAA (Pillar 0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• P6 羅致光</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSSA (Pillar 0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follows P0, but if (Pillar 0+Pillar 2) amount &lt;3,600; OALIS top-up to 3,600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pillar 2</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accumulated pension wealth from MPF will be converted to annual price inflation-indexed income streams using actuarial annuity factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pillar 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The present method, which follows the OECD model, ignores voluntary savings; and this limitation will be stated clearly as one of the caveats in the technical report.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pillar 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Health Care Voucher</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>(Annual for 70+)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Public Transport Fare</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Concession (Annual)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Children Support</td>
<td>0</td>
<td>500</td>
<td>800</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
<td>1,200</td>
</tr>
<tr>
<td>(Monthly)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:

\(^a\) CSSA: Average amount per recipient is $4,622 per month; OALA: $2,200 per month (starting from 65); OAA: $1,135 per month for 70+.

\(^b\) $1,687 represents the average additional allowance (rent, medical, etc.) received by current CSSA recipients. It is calculated from the total average amount per recipient minus the standard rate (i.e. $4,622 - $2,935 = $1,687).

For programme amount available from 70, it will be substituted by an actuarially equivalent amount as it were started from 65.
Main Findings

2.11 The results for the four retirement income indicators -- Gross Replacement Rate, Net Replacement Rate, Gross Relative Pension Level and Net Relative Pension Level – are computed for P0 and other various proposals.

2.12 They are summarized in Tables 2.2a to Table 2.2g. The rates are further decomposed by pillars, and the detail results are plotted in the Appendix 2. Sensitivity analysis were performed, the resulting graphs are also presented in the Appendix 2.

Table 2.2a Results for P0

<table>
<thead>
<tr>
<th>Multiples of Median Earnings</th>
<th>Gross Replacement Rate</th>
<th>Net Replacement Rate</th>
<th>Gross Relative Pension Level</th>
<th>Net Relative Pension Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEN</td>
<td>WOMEN</td>
<td>MEN</td>
<td>WOMEN</td>
</tr>
<tr>
<td>0</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>0.5</td>
<td>59.6%</td>
<td>56.3%</td>
<td>62.7%</td>
<td>56.3%</td>
</tr>
<tr>
<td>0.75</td>
<td>55.4%</td>
<td>55.9%</td>
<td>58.4%</td>
<td>58.8%</td>
</tr>
<tr>
<td>1</td>
<td>45.2%</td>
<td>42.0%</td>
<td>48.0%</td>
<td>44.3%</td>
</tr>
<tr>
<td>1.5</td>
<td>43.2%</td>
<td>38.9%</td>
<td>47.5%</td>
<td>41.7%</td>
</tr>
<tr>
<td>2</td>
<td>35.9%</td>
<td>37.1%</td>
<td>40.5%</td>
<td>41.0%</td>
</tr>
<tr>
<td>3</td>
<td>24.1%</td>
<td>26.9%</td>
<td>27.8%</td>
<td>30.6%</td>
</tr>
<tr>
<td>5</td>
<td>14.5%</td>
<td>16.2%</td>
<td>17.0%</td>
<td>18.9%</td>
</tr>
</tbody>
</table>

Table 2.2b Results for P1

<table>
<thead>
<tr>
<th>Multiples of Median Earnings</th>
<th>Gross Replacement Rate</th>
<th>Net Replacement Rate</th>
<th>Gross Relative Pension Level</th>
<th>Net Relative Pension Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEN</td>
<td>WOMEN</td>
<td>MEN</td>
<td>WOMEN</td>
</tr>
<tr>
<td>0</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>0.5</td>
<td>69.2%</td>
<td>73.0%</td>
<td>73.2%</td>
<td>73.0%</td>
</tr>
<tr>
<td>0.75</td>
<td>59.2%</td>
<td>64.1%</td>
<td>62.7%</td>
<td>67.8%</td>
</tr>
<tr>
<td>1</td>
<td>55.1%</td>
<td>58.0%</td>
<td>58.9%</td>
<td>61.5%</td>
</tr>
<tr>
<td>1.5</td>
<td>47.2%</td>
<td>47.4%</td>
<td>52.2%</td>
<td>51.0%</td>
</tr>
<tr>
<td>2</td>
<td>38.2%</td>
<td>41.9%</td>
<td>43.3%</td>
<td>46.5%</td>
</tr>
<tr>
<td>Multiples of Median Earnings</td>
<td>Gross Replacement Rate</td>
<td>Net Replacement Rate</td>
<td>Gross Relative Pension Level</td>
<td>Net Relative Pension Level</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------</td>
<td>----------------------</td>
<td>----------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td></td>
<td>MEN</td>
<td>WOMEN</td>
<td>MEN</td>
<td>WOMEN</td>
</tr>
<tr>
<td>0</td>
<td>NA</td>
<td>NA</td>
<td>34.7%</td>
<td>45.3%</td>
</tr>
<tr>
<td>0.5</td>
<td>64.8%</td>
<td>73.8%</td>
<td>68.2%</td>
<td>73.8%</td>
</tr>
<tr>
<td>0.75</td>
<td>52.4%</td>
<td>60.1%</td>
<td>55.2%</td>
<td>63.3%</td>
</tr>
<tr>
<td>1</td>
<td>47.0%</td>
<td>52.6%</td>
<td>49.9%</td>
<td>55.5%</td>
</tr>
<tr>
<td>1.5</td>
<td>37.8%</td>
<td>40.5%</td>
<td>41.7%</td>
<td>43.4%</td>
</tr>
<tr>
<td>2</td>
<td>30.1%</td>
<td>34.4%</td>
<td>34.0%</td>
<td>37.9%</td>
</tr>
<tr>
<td>3</td>
<td>20.2%</td>
<td>24.0%</td>
<td>23.3%</td>
<td>27.3%</td>
</tr>
<tr>
<td>5</td>
<td>12.1%</td>
<td>14.4%</td>
<td>14.2%</td>
<td>16.8%</td>
</tr>
</tbody>
</table>

Table 2.2e Results for P4

<table>
<thead>
<tr>
<th>Multiples of Median Earnings</th>
<th>Gross Replacement Rate</th>
<th>Net Replacement Rate</th>
<th>Gross Relative Pension Level</th>
<th>Net Relative Pension Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEN</td>
<td>WOMEN</td>
<td>MEN</td>
<td>WOMEN</td>
</tr>
<tr>
<td>0</td>
<td>NA</td>
<td>NA</td>
<td>34.6%</td>
<td>45.2%</td>
</tr>
<tr>
<td>0.5</td>
<td>75.7%</td>
<td>77.2%</td>
<td>79.7%</td>
<td>77.2%</td>
</tr>
<tr>
<td>0.75</td>
<td>56.1%</td>
<td>56.7%</td>
<td>59.1%</td>
<td>59.6%</td>
</tr>
<tr>
<td>1</td>
<td>47.2%</td>
<td>44.2%</td>
<td>50.2%</td>
<td>46.6%</td>
</tr>
<tr>
<td>1.5</td>
<td>44.5%</td>
<td>40.4%</td>
<td>49.0%</td>
<td>43.3%</td>
</tr>
<tr>
<td>2</td>
<td>36.9%</td>
<td>38.2%</td>
<td>41.7%</td>
<td>42.2%</td>
</tr>
<tr>
<td>3</td>
<td>24.8%</td>
<td>27.6%</td>
<td>28.6%</td>
<td>31.5%</td>
</tr>
<tr>
<td>5</td>
<td>14.9%</td>
<td>16.6%</td>
<td>17.5%</td>
<td>19.4%</td>
</tr>
</tbody>
</table>
Table 2.2f Results for P5

<table>
<thead>
<tr>
<th>Multiples of Median Earnings</th>
<th>Gross Replacement Rate</th>
<th>Gross Relative Pension Level</th>
<th>Net Replacement Rate</th>
<th>Net Relative Pension Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEN WOMEN</td>
<td>MEN WOMEN</td>
<td>MEN WOMEN</td>
<td>MEN WOMEN</td>
</tr>
<tr>
<td>0</td>
<td>NA</td>
<td>NA</td>
<td>31.5%</td>
<td>41.1%</td>
</tr>
<tr>
<td>0.5</td>
<td>78.3% 80.6%</td>
<td></td>
<td>39.1% 40.3%</td>
<td>41.6% 42.5%</td>
</tr>
<tr>
<td>0.75</td>
<td>55.4% 55.9%</td>
<td></td>
<td>41.6% 41.9%</td>
<td>44.2% 44.2%</td>
</tr>
<tr>
<td>1</td>
<td>45.2% 42.0%</td>
<td></td>
<td>45.2% 42.0%</td>
<td>48.0% 44.3%</td>
</tr>
<tr>
<td>1.5</td>
<td>43.2% 38.9%</td>
<td></td>
<td>64.7% 58.4%</td>
<td>68.8% 61.6%</td>
</tr>
<tr>
<td>2</td>
<td>35.9% 37.1%</td>
<td></td>
<td>71.8% 74.2%</td>
<td>76.2% 78.2%</td>
</tr>
<tr>
<td>3</td>
<td>24.1% 26.9%</td>
<td></td>
<td>72.3% 80.7%</td>
<td>76.8% 85.0%</td>
</tr>
<tr>
<td>5</td>
<td>14.5% 16.2%</td>
<td></td>
<td>72.4% 81.0%</td>
<td>76.9% 85.4%</td>
</tr>
</tbody>
</table>

Table 2.2g Results for P6

<table>
<thead>
<tr>
<th>Multiples of Median Earnings</th>
<th>Gross Replacement Rate</th>
<th>Gross Relative Pension Level</th>
<th>Net Replacement Rate</th>
<th>Net Relative Pension Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEN WOMEN</td>
<td>MEN WOMEN</td>
<td>MEN WOMEN</td>
<td>MEN WOMEN</td>
</tr>
<tr>
<td>0</td>
<td>NA</td>
<td>NA</td>
<td>31.5%</td>
<td>41.1%</td>
</tr>
<tr>
<td>0.5</td>
<td>59.6% 73.1%</td>
<td></td>
<td>32.9% 36.6%</td>
<td>31.7% 38.6%</td>
</tr>
<tr>
<td>0.75</td>
<td>55.4% 55.9%</td>
<td></td>
<td>41.6% 41.9%</td>
<td>44.2% 44.2%</td>
</tr>
<tr>
<td>1</td>
<td>45.2% 42.7%</td>
<td></td>
<td>45.2% 42.7%</td>
<td>48.0% 45.0%</td>
</tr>
<tr>
<td>1.5</td>
<td>43.2% 38.9%</td>
<td></td>
<td>64.7% 58.4%</td>
<td>68.8% 61.6%</td>
</tr>
<tr>
<td>2</td>
<td>35.9% 37.1%</td>
<td></td>
<td>71.8% 74.2%</td>
<td>76.2% 78.2%</td>
</tr>
<tr>
<td>3</td>
<td>24.1% 26.9%</td>
<td></td>
<td>72.3% 80.7%</td>
<td>76.8% 85.0%</td>
</tr>
<tr>
<td>5</td>
<td>14.5% 16.2%</td>
<td></td>
<td>72.4% 81.0%</td>
<td>76.9% 85.4%</td>
</tr>
</tbody>
</table>

2.13 Table 2.3 shows net replacement rates for various proposals with selected multiples of median earnings.

Table 2.3 Net Replacement Rates for Various Proposals

<table>
<thead>
<tr>
<th>PROPOSAL</th>
<th>0.5</th>
<th>0.75</th>
<th>1</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEN WOMEN</td>
<td>MEN WOMEN</td>
<td>MEN WOMEN</td>
<td>MEN WOMEN</td>
</tr>
<tr>
<td>P0</td>
<td>62.7% 56.3%</td>
<td>58.4% 58.8%</td>
<td>48.0% 44.3%</td>
<td>27.8% 30.6%</td>
</tr>
<tr>
<td>P1</td>
<td>73.2% 73.0%</td>
<td>62.7% 67.8%</td>
<td>58.9% 61.5%</td>
<td>29.7% 33.9%</td>
</tr>
<tr>
<td>P2</td>
<td>68.2% 73.8%</td>
<td>55.2% 63.3%</td>
<td>49.9% 55.5%</td>
<td>23.3% 27.3%</td>
</tr>
<tr>
<td>P3</td>
<td>82.9% 78.5%</td>
<td>72.3% 76.4%</td>
<td>68.5% 69.9%</td>
<td>35.5% 40.1%</td>
</tr>
<tr>
<td>P4</td>
<td>79.7% 77.2%</td>
<td>59.1% 59.6%</td>
<td>50.2% 46.6%</td>
<td>28.6% 31.5%</td>
</tr>
<tr>
<td>P5</td>
<td>82.4% 80.6%</td>
<td>58.4% 58.8%</td>
<td>48.0% 44.3%</td>
<td>27.8% 30.6%</td>
</tr>
<tr>
<td>P6</td>
<td>62.7% 73.1%</td>
<td>58.4% 58.8%</td>
<td>48.0% 45.0%</td>
<td>27.8% 30.6%</td>
</tr>
</tbody>
</table>
2.14 There are many types of income replacement indicators defined by OECD and they have different implications. If we focus on the net replacement rates in Table 2.3, which shows the value of the pension for specific individuals as a percentage of their own earnings (net of taxes and social security contributions, if any) when working. Under the existing system, rates are 48.0% for men and 44.3% for women in Hong Kong. Whilst there is no standard definition of what an adequate pension level should be, this set of rates is fairly comparable to 54.4%, the OECD average over 34 countries. However, the OECD average does not include informal support from children. If we remove this item from the calculation, the Hong Kong rates would drop about 8%.

2.15 The net replacement rates would be raised for low-income earners under the proposals with universal pension benefits. For example, consider \textbf{P2}, the projected rates for this proposal are 68.2% and 73.8% for men and women, respectively, for workers whose monthly wage is half of the median level. For proposals which aim at strengthen the protection of low-income groups, such as \textbf{P4}, the corresponding rates are 79.7% (men) and 77.2% (women) for the same low-income group earners.

2.16 For high-income groups (say, monthly salary is 3 times of the population median earnings), the rates are 27.8% for men and 30.6% for women under the existing system. The corresponding rates are 23.3% (men) and 27.3% (women) under \textbf{P2}, and the rates are 28.6% (men) and 31.5% (women) under \textbf{P4}. It should be noted that \textbf{P2} proposes transferring half of MPF contributions to the UPF; the net replacement rate results show the potential income redistribution effects in various proposals.

2.17 Although higher replacement rates seem preferable, they do not come without cost. The next two chapters examine the sustainability and affordability of the selected proposals.
Limitations

2.18 The methodology and assumptions for the computation of retirement-income indicators in this report are similar for the analysis of each proposal, allowing the design of various proposed pension systems to be compared directly. However, different proposals might create different degree of impacts on the future economic and social landscape in Hong Kong, such as labour force market, capital market, take-up rates of various Social Security programmes, etc., which are crucial factors affecting the original model assumptions. For example, the introduction of a universal pension scheme might discourage voluntary private savings for retirement and family transfer. Moreover, some proposals suggest additional contributions from employers to finance the universal pension. The employers’ response to such increase in hiring cost is unknown. These dynamic responses are not considered in this exercise.

2.19 The calculation of retirement-income indicators in this report focuses on a small number of representative (and hypothetical) individuals categorised by gender and multiples of median earnings. It is not possible to include all characteristic combinations of individuals in the study.

2.20 Under the baseline assumptions, workers earn the same percentage of median worker earnings throughout their career. Their wages are assumed to be fixed over their whole career life, which might not be the case in reality given wage growth and career advancement. The accrued MPF benefits might then be underestimated subject to this assumption. Specific individuals who have different actual earnings experience, career path and promotion pattern might need to be analysed separately.

2.21 There is no formal indexation for benefit parameters (e.g., allowance amounts of CSSA, OAA and OALA programs; proposed universal pension amounts under P1, P2 and P3; and amounts of informal support in Pillar 4), the model

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28 The Research Team has already extended to include more sample points in the study as compared to those results in the OECD report.
in this chapter assumes price indexation. It would have significant impacts on the results if the actual adjustments to the benefit parameters in future depart substantially from the price indexation assumption.

2.22 There is probably a correlation between investment knowledge (and hence theoretically achieving better investment returns) and income level (those who are financially-iterate are more likely to be higher earners). If this conjecture is true, different MPF return assumptions should be made for people at different income levels. However, the Research Team does not have data on this claim and assumes a single MPF return rate for all income levels.

2.23 The use of the projected life tables in 2013, instead of long range projected life tables in 2053 and beyond, would likely overestimate the Pillar 2 (MPF) component of the replacement rate calculations.

2.24 The present method, which follows the OECD model, ignores individual voluntary savings for retirement in Hong Kong. Unlike the Registered Retirement Savings Plan (RRSP) in Canada and the 401(k) in the U.S., Hong Kong does not have official savings account types created by government and conferring tax advantages designed to encourage individual to save for retirement. Assuming zero private savings is a strong assumption, especially when the new generation should tend to have better awareness on private saving so as to better prepare for retirement. This would in turn underestimate the post-retirement income.

2.25 For the past decades, research showed that informal children support for the older persons in Hong Kong has been changing. Shrinking of family sizes and changes in traditional filial piety values are examples of factors affecting the amount of children support for the future elderly people in Hong Kong. The assumptions for “Children Support” made in Table 2.1 are based on

judgement by the Research Team. Detailed long-term projections of possible pecuniary support from children in Pillar 4 require substantial research and comprehensive longitudinal survey data, and such results are not available to the Research Team.
Chapter 3: Sustainability: A Dynamic Projection of the Underlying Universal Pension Fund

Background

3.1 Sustainability refers to financial soundness of the scheme, now and in the future.\textsuperscript{30}

3.2 It is assumed that the proposals P1 to P3 are “self-funded” types. The proposed system in each proposal is supported by an independent fund (i.e., separated from the government accounts). For discussion purpose, the fund is named as Universal Pension Fund (UPF) in this technical report.

3.3 For proposals P4 to P6, it is assumed that they are funded by the government general revenues, financial soundness of these schemes depend on their “affordability” to the Government\textsuperscript{31}.

3.4 There are too many unknown parameters in the P6 scheme and it is difficult, if not impossible, to provide a reasonable projection for P6. The Research Team decided not to perform sustainability nor affordability studies on P6.

3.5 In this chapter, a dynamic projection of the cash inflows, outflows and the balance of the UPF under each scheme (P1, P2 and P3) from 2013 to 2041 are conducted. It should be emphasized that the results in this chapter are based on a 29-year projection and it does not provide any information regarding the sustainability of the various proposals after the year 2041. This limitation will be stated again at the end of this chapter.

\textsuperscript{30} Supra, note 4, page 56.

\textsuperscript{31} The affordability of the proposed schemes will be discussed in Chapter 4.
3.6 Demographic, economic and financial assumptions adopted in this report that apply to all P1, P2 and P3 proposals are provided in the “Summary of Key Assumptions” section located at the beginning of this report.

3.7 The following sections provide data, assumptions and results that are proposal-specific.

The Model, Assumptions and Results for P1

3.8 The proposal P1 is submitted by The Hong Kong Federation of Trade Unions (工聯會). The Research Team follows the basic scheme specifications by the proposer. The proposed system is assumed to start from 2016 and selected fund injections from 2014

Baseline Model: Cash Inflows

3.9 The model specification and assumptions for cash inflows to the UPF are as follows:

- Four injections of funds from the government’s Land Fund to the UPF in years 2014, 2016, 2026 and 2036 will be transferred. Each injection is of amount HK$50 billion (in 2013 constant dollar).

- Investment return on Land Fund will be injected to the UPF each year from 2014.

- Starting from 2014, five per cent of the government surplus\(^{32}\) (if any) in each year will be transferred to the UPF.

\(^{32}\) The projected amounts of government surplus/deficit from 2013 to 2041 under the Base Case (No Service Enhancement Scenario) are provided by the Working Group on Long-Term Fiscal Planning.
Starting from 2014, 1% extra profit tax rate will be imposed on companies with assessable profit higher than HK$10 million. The entire additional amount\textsuperscript{33} received each year would be transferred to the UPF.

After the implementation of P1 in 2016, the other old-age security programmes (OAA and OALA) will be terminated. As for the old-age CSSA scheme, in addition to the standard rates, elderly CSSA recipients may entitle to one or more supplements (e.g., long-term supplement, community living supplement, transport supplement and residential care supplement)\textsuperscript{34}. In order to prevent double benefits, the Research Team assumes that while an elderly CSSA recipient will still be able to receive supplements, he or she will be ceased to get the CSSA standard amount after the implementation of P1\textsuperscript{35}. The projected expenditures on these terminated programmes will be transferred from the government to the UPF from 2016. The base model and results developed in Chapter 1 will be used for this item. Without further specifications, it is assumed that in all the retirement protection proposals elderly DA recipients are allowed to continue receiving the DA besides the universal pension payouts.

Starting from 2021, both employers and employees have to transfer 1% (out of the 5% contribution rate under the MPF rule) of their MPF contributions to the UPF. Furthermore, an addition of 0.5% contribution is imposed on both employers and employees using the MPF rule without limiting the maximum relevant income level\textsuperscript{36}. The additional contributions will be deposited to the UPF. The projected annual amount is computed by the Research Team using the demographic, economic and financial assumptions stated in the “Summary of Key Assumptions” section located at the beginning of this report.

\textsuperscript{33} See para. 3.17 of this technical report.
\textsuperscript{34} See, http://www.swd.gov.hk/en/index/site_pubsvc/page_socsecu/sub_comprehens/
\textsuperscript{35} It is because the universal pension will be paid in lieu of the CSSA standard amount (HK$2,935 in June 2013) to cover the basic need of an elderly.
\textsuperscript{36} Since the universal pension starts at 65, the Research Team assumes that all the contributions will be ceased after the employee reached 65, same as the current MPF rule.
• The amount in the UPF will be invested by the Hong Kong Monetary Authority. The real rate of investment return is expected to be comparable to that of the Exchange Fund. The Research Team assumes that the real rate is at the 2% level\textsuperscript{37}. All the investment income will be debited back to the UPF. If the UPF balance is in deficit, this real rate of 2\% is also used as the assumption of the borrowing rate to finance the negative balance of the Fund.

**Baseline Model: Cash Outflows**

3.10 The model specification and assumptions for cash outflows to the UPF are as follows:

• Starting in 2016, the UPF will pay HK$3,250 (in 2013 constant dollar) per month to each Hong Kong residents aged 65 and above.

• The annual administrative cost of the UPF system is approximated as half of the 2013 MPFA operating expenditure, which is HK$0.24 billion\textsuperscript{38}.

**Baseline Model: Results**

3.11 The projection results (both in real term and nominal term) are plotted in Chart 3.1.

3.12 The capital injections from the Land Fund would make the UPF staying in a positive position in the first 15 years or so. However, the effect of population ageing would cause the increase of the speed of spending on the universal pension payouts. On the other hand, the inflows from employment contributions would slow down due to the same demographic reason (ageing).

\textsuperscript{37} See the real investment return rate assumption stated in the “Summary of Key Assumptions” Section.

\textsuperscript{38} The operating expenditure of the MPFA for the year ended 31 March 2013 is around HK$480 million. See, page 83 of the *MPFA Annual Report 2012/13.*
A structural annual deficit would be expected from 2017. The UPF balance would turn negative from the year 2030.

Chart 3.1a Projected Operations of the P1 Universal Pension Fund at 2013 Constant Price

Chart 3.1b Projected Operations of the P1 Universal Pension Fund at Nominal Price
Sensitivity Analysis: Different Investment Rate of Returns

3.13 A 2% real rate of investment return on the UPF system is assumed in the baseline model. It is a rounded figure from the difference between the nominal long-term investment rate of return (5%) on the Exchange Fund and the annual price inflation (3.1%) per year assumed by the Working Group on Long-Term Fiscal Planning.\(^\text{39}\)

3.14 The historical nominal rates of return on the Exchange Fund are plotted in Chart 3.2. The rates range from -5.6% per annum (in 2008) to the peak at 12.1% per year (in 1998). For sensitivity analysis, the Research Team examined three additional real rates of return assumptions on the UPF in this study. They are 0.5%, 1.5% and 2.5%.

3.15 To save spaces, only the set of graphs in 2013 constant dollars is displayed. The results are plotted in Charts 3.3.

\textit{Chart 3.2 } \textit{Investment Return of the Exchange Fund (1994 to 2013)}

\begin{center}
\includegraphics[width=0.8\textwidth]{chart3_2.png}
\end{center}

\textit{Source: HKMA}\(^\text{40}\)

\(^{39}\) \textit{Supra}, note 41.

\(^{40}\) \url{http://gia.info.gov.hk/general/201401/23/P201401230563_0563_123914.pdf}
Chart 3.3a  Projected Results on P1 UPF (in 2013 Constant Dollar) with i=0.5%

Chart 3.3b  Projected Results on P1 UPF (in 2013 Constant Dollar) with i=1.5%
Sensitivity Analysis: Profit Tax

3.16 Under P1, one per cent extra profit tax rate will be imposed on companies with assessable profit over HK$10 million. The entire additional amount received each year will be transferred to the UPF.

3.17 Using the average data for the last seven years of assessment from the Inland Revenue Department\(^1\), the amount (in 2013 constant dollar) per year of inflows to UPF from this source would be around HK$5.38 billion.

3.18 However, the uncertainty of this estimate would be fairly high, as it heavily depends on the future business and economic environment in Hong Kong.

3.19 For sensitivity analysis, the Research Team considered two scenarios on the profit tax assumption in this study. They are: (a) on the average, 10% more than the expected amount per year would be received by UPF, and (b) on the average, 10% less than the expected amount per year would be received by UPF. The results are plotted in Chart 3.4.

Chart 3.4a  Projected Results on P1 UPF (in 2013 Constant Dollar) with 10% More Than the Expected Amount per year from the Profit Tax Source

Chart 3.4b  Projected Results on P1 UPF (in 2013 Constant Dollar) with 10% Less Than the Expected Amount per year from the Profit Tax Source


**Sensitivity Analysis: Contributions from Employees and Employers**

3.20 One of the major sources of inflows to the UPF is the total contributions from employment. Detailed age-gender specific income distributions for the year 2013 have been tabulated. These distributions have been applied to the projected employed population to estimate the contribution amount per year to be transferred to UPF.

3.21 For sensitivity analysis, the Research Team considered three scenarios on the contribution assumption in this study. They are: (a) on the average, 5% more than the expected amount per year would be received by UPF, (b) on the average, 5% less than the expected amount per year, and (c) 10% less than the expected amount per year would be received by UPF. The results are plotted in Chart 3.5.

*Chart 3.5a  Projected Results on P1 UPF (in 2013 Constant Dollar) with 5% More Than the Expected Amount per year from the Employment Contribution Source*
Chart 3.5b  Projected Results on P1 UPF (in 2013 Constant Dollar) with 5% Less Than the Expected Amount per year from the Employment Contribution Source

Chart 3.5c  Projected Results on P1 UPF (in 2013 Constant Dollar) with 10% Less Than the Expected Amount per year from the Employment Contribution Source
Additional Sensitivity Analysis for P1: UPF Benefit Amount

Chart 3.5d  Projected Results on P1 UPF (in 2013 Constant Dollar) with the monthly benefit amount decreased 10% from $3,250 to $2,925
Testing Sustainability: An Adverse Scenario

3.22 Sensitivity analyses are performed by varying some projection parameters in isolation. However, some of the parameters may have strong correlations. For example, a low-growth economy may lead to lower returns on the UPF, lower profit tax being received, lower number of employed workers, as well as higher take-up rate of social security benefits.

3.23 The Research Team considered an adverse scenario with the following specifications of the projection parameters throughout the projection period: (a) the real rate of return on UPF dropped down from 2% to 1% per annum, (b) on the average, 5% less than the expected amount from profit tax source per year, and (c) 5% less than the expected amount per year from employment contribution source would be received by UPF.

3.24 Even though the projected government transfers from the terminated social security programmes should be computed using the “high take-up rate scenario” under a low-growth economy in Chapter 1, as an adverse scenario, the Research Team assumes that the transfers to UPF would not be increased and would stay at the BASE take-up rate level.

3.25 It is important to note that the adverse scenario is not a forecast, but rather a hypothetical scenario designed to assess the strength of the proposed pension systems and their resilience to an adverse economic environment.

3.26 The results are plotted in Chart 3.6.
Testing Sustainability: A Shock Analysis

3.27 Being a small and open economy, Hong Kong is susceptible to adverse shocks in the global economy. The 1997-98 Asian Financial Crisis and the 2008-09 Global Financial Tsunami are two examples of severe shocks that had hit Hong Kong hard, causing economic recession in Hong Kong.

3.28 For the purpose of scenario testing, the Research has constructed a hypothetical case that assumes the Hong Kong economy to dip into a recession in 2020 and 2021, followed by a sluggish recovery in 2022 to 2024. It is important to note that the shock scenario is not a forecast, but rather a hypothetical scenario designed to assess the strength of the proposed pension systems when they encounter some "shock" of acute adverse experience. The following table shows the specifications of the Shock Case.
<table>
<thead>
<tr>
<th>Year</th>
<th>Real Return Rate on UPF</th>
<th>Expected Receipt from Profit Tax Source</th>
<th>Expected Receipt from Employment Source</th>
<th>Take-Up Rates of CSSA, OALA &amp; OAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>-2.0%</td>
<td>-15%</td>
<td>-15%</td>
<td>BASE</td>
</tr>
<tr>
<td>2021</td>
<td>0.0%</td>
<td>-10%</td>
<td>-10%</td>
<td>BASE</td>
</tr>
<tr>
<td>2022</td>
<td>0.5%</td>
<td>-5%</td>
<td>-5%</td>
<td>BASE</td>
</tr>
<tr>
<td>2023</td>
<td>1.0%</td>
<td>-3%</td>
<td>-3%</td>
<td>BASE</td>
</tr>
<tr>
<td>2024</td>
<td>1.5%</td>
<td>-1%</td>
<td>-1%</td>
<td>BASE</td>
</tr>
<tr>
<td>2025+</td>
<td>Back to Baseline Assumptions</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.29 The results are plotted in Chart 3.7.

Chart 3.7 Projected Results on P1 UPF (in 2013 Constant Dollar)
(The Shock Scenario)
The Model, Assumptions and Results for P2

3.30 The proposal P2 is submitted by The Alliance for Universal Pension (爭取全民退保聯席). The Research Team follows the basic scheme specifications by the proposer. The proposed system is assumed to start in 2013 with government’s fund injection in 2012.

Baseline Model: Cash Inflows

3.31 The model specification and assumptions for cash inflows to the UPF are as follows:

- One-off injection of seed fund from the government to the UPF, of amount HK$50 billion (in 2013 constant dollar) is required in the year 2012.

- Starting from 2013, 1.9% extra profit tax rate will be imposed on companies with assessable profit over HK$10 million. The entire additional amount received each year will be transferred to the UPF.

- Analogous to the P1 proposal, the projected expenditures on the terminated old-age security programmes will be transferred from the government to the UPF (from 2013). The base model and results developed in Chapter 1 will be used for this item.

- Starting from 2013, both employers and employees have to transfer 2.5% (out of the 5% contribution rate under the MPF rule) of their MPF contributions to the UPF. Furthermore, the maximum relevant income level for these contributions will be lifted up to HK$30,000 per month (instead of HK$25,000 under the 2013 MPF rule). The projected annual amount is computed by the Research Team using the method described in the P1 assumption paragraph of this Chapter.
• The amount in the UPF will be invested by the Hong Kong Monetary Authority. The real rate of investment return is assumed as 2% per annum. All the investment income will be debited back to the UPF.

Baseline Model: Cash Outflows

3.32 The model specification and assumptions for cash outflows to the UPF are as follows:

• Starting in 2013, the UPF will pay HK$3,422 (in 2013 constant dollar) per month to each Hong Kong residents aged 65 and above42.

• The annual administrative cost of the UPF system is approximated as half of the 2013 MPFA operating expenditure, which is HK$0.24 billion.

Baseline Model: Results

3.33 The projection results (both in real term and nominal term) are plotted in Chart 3.8.

3.34 The UPF balance is able to stand above zero during the projection period (2013-2041). It should be noted that the inflows from employment contributions are projected to have a slow downward trend due to ageing of the Hong Kong population. On the other hand, the pension payouts of are expected to be steadily climbing in future. The outflows are projected to take over the inflows from 2028 and this structural annual deficit might be carrying on long after 2041, depleting the UPF balance.

42 The original P2 proposal stated the amount of HK$3,000 per month at 2010 level; the Research Team translated this amount to HK$3,422 (in June 2013 constant dollar) using the Hong Kong composite CPI figures published by the Census and Statistics Department.
Chart 3.8a Projected Operations of the P2 Universal Pension Fund at 2013 Constant Price

Chart 3.8b Projected Operations of the P2 Universal Pension Fund at Nominal Price
Sensitivity Analysis: Different Investment Rate of Returns

Chart 3.9a  Projected Results on P2 UPF (in 2013 Constant Dollar) with i=0.5%

Chart 3.9b  Projected Results on P2 UPF (in 2013 Constant Dollar) with i=1.5%
Sensitivity Analysis: Profit Tax

Chart 3.9c  Projected Results on P2 UPF (in 2013 Constant Dollar) with $i=2.5\%$

Chart 3.10a  Projected Results on P2 UPF (in 2013 Constant Dollar) with 10% More Than the Expected Amount per year from the Profit Tax Source
Sensitivity Analysis: Contributions from Employees and Employers

Chart 3.10b  Projected Results on P2 UPF (in 2013 Constant Dollar) with 10% Less Than the Expected Amount per year from the Profit Tax Source

Chart 3.11a  Projected Results on P2 UPF (in 2013 Constant Dollar) with 5% More Than the Expected Amount per year from the Employment Contribution Source
Chart 3.11b  Projected Results on P2 UPF (in 2013 Constant Dollar) with 5% Less Than the Expected Amount per year from the Employment Contribution Source

Chart 3.11c  Projected Results on P2 UPF (in 2013 Constant Dollar) with 10% Less Than the Expected Amount per year from the Employment Contribution Source
Additional Sensitivity Analysis for P2: UPF Benefit Amount

Chart 3.12  Projected Results on P2 UPF (in 2013 Constant Dollar) with the monthly benefit amount increased 5% from $3,422 to $3,593

Testing Sustainability: The Adverse Scenario

Chart 3.13  Projected Results on P2 UPF (in 2013 Constant Dollar) (The Adverse Scenario)
Testing Sustainability: The Shock Analysis

Chart 3.14  Projected Results on P2 UPF (in 2013 Constant Dollar)
(The Shock Scenario)
The Model, Assumptions and Results for P3

3.35 The proposal P3 is submitted by The Professional Commons (公共專業聯盟). The Research Team follows the basic scheme specifications by the proposer. The proposed system is assumed to start from 2017.

Baseline Model: Cash Inflows

3.36 The model specification and assumptions for cash inflows to the UPF are as follows:

- One injection of seed fund from the government to the UPF in year 2017, of amount HK$50 billion (in 2013 constant dollar); then five subsequent transfers, each at the amount of HK$25 billion (in 2013 constant dollar), will be made in years 2022, 2027, 2032, 2037 and 2042 (beyond the study period of this study).

- Analogous to the P1 and P2 proposals, the projected expenditures on the terminated old-age security programmes will be transferred from the government to the UPF (from 2017). The base model and results developed in Chapter 1 will be used for this item.

- Starting from 2017, both employers and employees have to make an additional 2.5% contributions to the UPF. Furthermore, the maximum relevant income level for these contributions will be lifted up to HK$80,000 per month (instead of HK$25,000 under the 2013 MPF rule). The projected annual amount is computed by the Research Team using the method described in the P1 assumption paragraph of this chapter.

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43 The P3 proposed keeping the current MPF system with 5% contribution rate for both employers and employees. The 2.5% UPF contributions are on the top of the MPF payments.
The amount in the UPF will be invested by the Hong Kong Monetary Authority. The real rate of investment return is assumed as 2% per annum. All the investment income will be debited back to the UPF.

Baseline Model: Cash Outflows

3.37 The model specification and assumptions for cash outflows to the UPF are as follows:

- Starting in 2017, the UPF will pay HK$3,479 (in 2013 constant dollar) per month to each Hong Kong residents aged 65 and above44.

- The annual administrative cost of the UPF system is approximated as half of the 2013 MPFA operating expenditure, which is HK$0.24 billion.

Baseline Model: Results

3.38 The projection results (both in real term and nominal term) are plotted in Chart 3.15.

3.39 The capital injections from the government and 2.5% contributions from both employers and employees would make the UPF staying in a positive position in the first 20 years or so. However, the effect of population ageing would cause the increase of the speed of spending on the universal pension payouts. On the other hand, the inflows from employment contributions would slow down due to the same demographic reason (ageing). These would lead to a structural annual deficit from 2024. The UPF balance would turn negative from the year 2036.

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44 The original P3 proposal stated the amount of HK$4,000 per month at 2017 level; the Research Team translated this amount to HK$3,479 (in June 2013 constant dollar) using the Hong Kong composite CPI figures published by the Census and Statistics Department.
Chart 3.15a Projected Operations of the P3 Universal Pension Fund at 2013 Constant Price

Chart 3.15b Projected Operations of the P3 Universal Pension Fund at Nominal Price
Sensitivity Analysis: Different Investment Rate of Returns

Chart 3.16a  Projected Results on P3 UPF (in 2013 Constant Dollar) with $i=0.5\%$

Chart 3.16b  Projected Results on P3 UPF (in 2013 Constant Dollar) with $i=1.5\%$
Sensitivity Analysis: Contributions from Employees and Employers

Chart 3.16c  Projected Results on P3 UPF (in 2013 Constant Dollar) with i=2.5%

Chart 3.17a  Projected Results on P3 UPF (in 2013 Constant Dollar) with 5% More Than the Expected Amount per year from the Employment Contribution Source
Chart 3.17b  Projected Results on P3 UPF (in 2013 Constant Dollar) with 5% Less Than the Expected Amount per year from the Employment Contribution Source

Chart 3.17c  Projected Results on P3 UPF (in 2013 Constant Dollar) with 10% Less Than the Expected Amount per year from the Employment Contribution Source
Additional Sensitivity Analysis for P3: UPF Benefit Amount

Chart 3.17d  Projected Results on P3 UPF (in 2013 Constant Dollar) with the monthly benefit amount decreased 5% from $3,479 to $3,305
Testing Sustainability: The Adverse Scenario

Chart 3.18  Projected Results on P3 UPF (in 2013 Constant Dollar)
(The Adverse Scenario)

Testing Sustainability: The Shock Analysis

Chart 3.19  Projected Results on P3 UPF (in 2013 Constant Dollar)
(The Shock Scenario)
Summary of Main Findings

3.40 The sustainability study has been performed to proposals with UPF (i.e., P1, P2 and P3). A dynamic projection of cash inflows, outflows and the balance of UPF under these proposals from 2013 to 2041 are conducted. Whilst there is no standard definition of “sustainability”, it is reasonable to expect that a sustainable proposal is able to meet the following requirement:

*In long-term, the projected cash inflow and assets of the UPF shall be sufficient to cover the associated benefit payments from the proposed scheme every year in the future. It implies that the projected UPF balance should be always positive during the study period (and hopefully, beyond the study period).*

3.41 For **P1**, the projected UPF balance (at 2013 constant prices) would turn negative (-$9 billion) in 2030; and the deficit would continue to accumulate to -$248.5 billion in 2041. The sustainability of **P1** is questionable under the current specification.

3.42 For **P2**, the projected UPF balance (at 2013 constant prices) would always stay in the positive regime from 2013 to 2041, with a peak at $238.2 billion in 2027. However, the projected outflows are expected to take over the inflows after 2028; creating a structural annual deficit after that year. The UPF balance in 2041 would still stand at positive value of $127.0 billion; it meets the sustainability requirement within the study period (2013-2041). However, it would need an extended study to examine its sustainability beyond 2041.

3.43 For **P3**, the projected UPF balance (at 2013 constant prices) would turn negative (-$20.1 billion) in 2036; and the deficit would continue to accumulate to -$116.7 billion in 2041. The sustainability of **P3** is questionable under the current specification.
3.44 Sensitivity tests were also performed to measure the impact on the financial sustainability of the proposals under an adverse and a shock scenario. The results show that P2 is still sustainable within the study period under the shock scenario, but the UPF balance would be significant reduced from $127.0 billion (no shocks) to $79.1 (with shocks) in 2041. On the other hand, P2 is marginally not able to sustain under the adverse scenario, its projected UPF balance would just turn red (at -$3.8 billion) first time in 2041.

Limitations

3.45 The methodology and assumptions for projecting the UPF accounts in this chapter are similar for the analysis of each proposal, allowing the design of various proposed pension systems to be compared directly. However, different proposals might create different degree of impacts on the future economic and social landscape in Hong Kong, such as labour force market, capital market, take-up rates of various Social Security programmes, etc., which are crucial factors affecting the original model assumptions.

3.46 Disregarding these dynamic responses might affect our current projections on cash inflows and outflows. For example, both P1 and P2 propose raising the profit tax rate to finance the UPF, e.g. extra 1.9 % points in P2 (i.e., from 16.5% to 18.4%, a 11.5% increase) on firms with assessable profits exceeding $10 million. But such increase might affect Hong Kong’s competitiveness and entice some firms to leave Hong Kong, resulting in lower profits tax revenue than the current projections.

3.47 The eligibility and contribution requirements for the universal pension in P1, P2 and P3 have not been unambiguously stated in the proposals. In order to provide a common framework for comparison, the Research Team makes a working assumption that all person who belong to the “65+ resident population” defined by the CSD are eligible for UPF benefits; and all
employed persons aged between 15 and 64 are assumed to be employees covered by the MPF system giving UPF contributions. It should be cautioned that the projections in this chapter may highly depend on the exact definitions of eligibility and contribution requirements under the UPF system.

3.48 The purpose of this chapter is to construct the long-term projection of the UPF accounts under proposals $P_1$, $P_2$ and $P_3$ for comparison. The projections involve a number of variables and assumptions about the future. Given such a long time horizon of near 30 years, the extent of uncertainty is unavoidably very large.

3.49 Many pension policy studies and population projections are looking into very long-term trends. For example, the United Nations published the projection paper “World Population to 2300”\(^{46}\). The official demographic projection data (such as population, labour force, labour force participation rates) in Hong Kong are only available from the Census and Statistics Department up to 2041. Hence, the projections in this technical report end in 2041.

3.50 The results in this chapter are based on a 29-year projection and it does not provide any information regarding the sustainability of the various proposals after the year 2041.

\(^{45}\) The first age band in the income distribution is 15-19. In reality, employed persons aged 15-17 need not join MPF. It may overestimate the UPF contributions from this age group. However, it is expected that the number of employed persons aged 15-17 with income higher than the minimum level of “relevant income” would not be large. The impact would not be significant.

Chapter 4: Affordability: Cost Sharing Between Individuals, Private Sectors and the Government

Background

4.1 Affordability refers to financial capacity of individuals and society\(^{47}\). In this chapter, the Research Team projects the total and extra\(^{48}\) financial burden to individuals, companies and the government after the pension reform.

4.2 For P1 to P3, the results can be obtained directly from their corresponding Sustainability Studies. Additional model and assumptions will be needed for P4 and P5.

The Model, Assumptions and Results for P1

Financial Resources and Total Cost

4.3 The relevant costs per year of each proposal refer to the projected benefits payment and administrative cost (i.e., expenditures or cash outflows) of that year. On the other hand, the total cost per year of the system should equal to the total amount of financial resources (i.e., cash inflows) directed into the scheme plus the change of the UPF balance in that year. A negative change in the UPF balance indicates that UPF assets were used to cover the deficit occurred in that year. On the other hand, when the total amount of cash inflows is larger than that of cash outflows for a particular year, the surplus will be used to build up the UPF balance.

\(^{47}\) Supra, note 4, page 56.
\(^{48}\) It is defined as the costs in addition to the P0 (Status Quo) scenario.
4.4 The following accounting identity explains the concept. For any given year in the projection period:

\[
\text{Cash Inflows to UPF (financial resources, i.e., income)} = \text{Cash Outflows from UPF (costs, i.e., expenditures)} + \text{Change in UPF balance}
\]

4.5 Therefore, we can decompose the fund inflows each year to the UPF by their sources (the government, companies and individuals) to examine how the financial burden (costs plus changes in UPF balance) is shared among different parties. For P1:

- **Government**: Injections from Land Fund; 5% on surplus; return on Land Fund and expected expenditures on the terminated old-age security programmes.
- **Companies**: 1% extra profit tax; employers’ contributions.
- **Individuals**: Employees’ contributions.
- **Interest**: 2% real rate of return per annum earned from a positive UPF balance.

4.6 The UPF balance of P1 would turn negative in 2030\(^{50}\), reflecting that the aggregate financial resources gathered is less than the aggregate cost of the proposal during the study period. In order to reflect this shortfall, an item “increases in unfunded UPF balance” has been created to measure this amount annually after 2030.

4.7 It should be noted that the item “increases in unfunded UPF balance” is a component of the total cost to the P1 system\(^{51}\). For proposals with negative UPF balances, the policy\(^{52}\) of financing such shortfalls might affect the allocation of the total financial burden to individuals, private sectors and the government. In the absence of such policies, we will leave this item

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\(^{49}\) The 1% MPF contribution made by employers is required to transfer to the UPF under P1. Currently, this amount would be classified as a fund source from employers on “out-of-pocket” basis. However, without such transfer requirement, this amount would have been paid to employee’s MPF account. It might be viewed as a loss and thus a cost to employees. See paragraph 4.10 later for more discussions.

\(^{50}\) See Chart 3.1a in Chapter 3 of this technical report.

\(^{51}\) The unfunded UPF balance would incur financing cost, further increasing the unfunded balance next year.

\(^{52}\) i.e., the rule to determine how to share and finance the shortfall among the government, companies and individuals. Hence, investment income on the UPF, positive or negative (i.e., financing cost of the negative UPF balance), would not be allocated to any source and left as an independent item.
4.8 The annual financial resources and total cost of P1, both expressed in 2013 constant dollar and nominal prices, are plotted in Charts 4.1.

Chart 4.1a  Projected Annual Financial Resources and Total Cost for P1  
(in 2013 Constant Dollar, in HK$ billions)

Chart 4.1b  Projected Annual Financial Resources and Total Cost for P1  
(in Nominal Price, in HK$ billions)
Extra financial resources acquired

4.9 Some components of the total projected cash inflows to the UPF in each year would be incurred with or without the pension reform. They are projected expenditure in the P0 (Status Quo) scenario.

4.10 In order to examine the “marginal” financial implications by the proposal, the shares of additional financial implication are computed. The extra financial resources acquired for P1, decomposed by their sources (the government, companies and individuals) are plotted in Chart 4.2a and Chart 4.2b under the following two approaches.

Out-of-Pocket Approach
- **Government**: Injections from Land Fund and the 5% on surplus would be included as the extra item; while the expected expenditures on the terminated old-age security programme would be excluded since they are existing costs.
- **Companies**: 1% extra profit tax and the addition of 0.5% employers’ contribution using MPF rule without ceiling on the maximum relevant income level would be included. The 1% MPF transfers would be excluded as the employers have to pay this amount with or without the reform.
- **Individuals**: Both the 1% and the additional 0.5% employees’ contributions would be included as the extra item; because these amounts would be taken out from the employees’ MPF account.

Opportunity Cost Approach
- However, the 1% MPF transfers originally contributed by employers could be classified as employees’ “extra” cost, as the amount would be effectively taken out from the employee’s MPF account. If we include this amount and allocate it to employees, the results are re-drawn in Chart 4.2b.

---

53 While "extra" financial resources may include investment income (positive or negative) and increases in unfunded liabilities, we only produce charts which concentrate on the three main contributors (the government, companies and individuals) of the system.
*With these projected extra financial resources for P1, the UPF balance would turn negative in 2030 and would leave a total UPF deficit balance of $248.5b (in 2013 constant dollar) in 2041.
*With these projected extra financial resources for P1, the UPF balance would turn negative in 2030 and would leave a total UPF **deficit** balance of $248.5b (in 2013 constant dollar) in 2041.*
The Model, Assumptions and Results for P2

Financial Resources and Total Cost

4.11 The cash inflows to the UPF in each projection year have been decomposed by their sources (the government, companies and individuals) to examine how the financial burden (costs plus changes in UPF balance) is shared among different parties. For P2:

- **Government**: Initial injection of $50b; and expected expenditures on the terminated old-age security programmes.
- **Companies**: 1.9% extra profit tax; 2.5% employers’ contributions with extended income ceiling to $30,000.
- **Individuals**: 2.5% Employees’ contributions with extended income ceiling to $30,000.
- **Interest**: 2% real rate of return per annum earned from a positive UPF balance.

4.12 The cash inflows to the UPF by sources (as well as the projected annual total cost) for P2, both expressed in 2013 constant dollar and nominal prices, are plotted in Charts 4.3. The UPF balance of P2 is projected to remain positive during the study period, suggesting that the aggregate financial resources gathered is more than the aggregate cost of the proposal, creating a positive UPF balance of $127b in 2041. The shortfall item “increases in unfunded UPF balance” does not exist in P2 during the projection period.

4.13 The results are plotted in Chart 4.3.

---

54 See Chart 3.8a in the Chapter 3 of this report.
Chart 4.3a  Projected Annual Financial Resources and Total Cost for P2  
(in 2013 Constant Dollar, in HK$ billions)

Chart 4.3b  Projected Annual Financial Resources and Total Cost for P2  
(in Nominal Price, in HK$ billions)
Extra financial resources acquired

4.14 The total additional financial resources gathered under P2 in each projection year have been decomposed by its sources (the government, companies and individuals)\textsuperscript{55}. The results are plotted in Chart 4.4.

\textit{Out-of-Pocket Approach}

- \textbf{Government}: Initial injection of $50b.
- \textbf{Companies}: 1.9\% extra profit tax and the difference of 2.5\% employers’ contribution using MPF rule with HK30,000 per month (instead of HK$25,000) as ceiling on the maximum relevant income level would be included.
- \textbf{Individuals}: The total employees’ 2.5\% contributions with extended income ceiling would be included as the extra item; because these amounts would be taken out from the employees’ MPF account.

\textit{Opportunity Cost Approach}

- The 2.5\% MPF transfers originally contributed by employers could be classified as employees’ “extra” opportunity cost, as the amount would be effectively taken out from the employee’s MPF account. However, the difference of 2.5\% employers’ contribution using MPF rule with HK30,000 per month (instead of HK$25,000) as ceiling on the maximum relevant income level would still be included as employers’ extra item, while the remaining amount would be allocated to employees. The results are re-drawn in Chart 4.4b.

\textsuperscript{55}While "extra" financial resources may include investment income (positive or negative) and increases in unfunded liabilities, we only produce charts which concentrate on the three main contributors (the government, companies and individuals) of the system.
*With these projected extra financial resources for P2, the UPF balance in 2041 would be a surplus of $127.0b (in 2013 constant dollar)*
With these projected extra financial resources for P2, the UPF balance in 2041 would be a \textit{surplus} of $127.0b (in 2013 constant dollar)
The Model, Assumptions and Results for P3

Financial Resources and Total Cost

4.15 The cash inflows to the UPF by sources (as well as the projected annual total cost), both expressed in 2013 constant dollar and nominal prices, are plotted in Charts 4.5. The projected UPF balance of P3 would turn to negative in 203656, reflecting that the aggregate financial resources gathered is less than the aggregate cost of the proposal during the study period.

4.16 The fund inflows to the UPF in each projection year have been decomposed by its sources (the government, companies and individuals) to examine how the financial burden (costs plus changes in UPF balance) is shared among different parties. For P3:

- **Government**: Government injections; and expected expenditures on the terminated old-age security programmes.
- **Companies**: 2.5% Employers’ contributions with extended income ceiling to $80,000
- **Individuals**: 2.5% Employees’ contributions with extended income ceiling to $80,000.
- **Increases in unfunded UPF balance**
- **Interest**: 2% real rate of return per annum earned from a positive UPF balance.

4.17 The results are plotted in Charts 4.5.

---

56 See Chart 15a in the Chapter 3 of this report.
Chart 4.5a  Projected Annual Financial Resources and Total Cost for P3
(in 2013 Constant Dollar, in HK$ billions)

Chart 4.5b  Projected Annual Financial Resources and Total Cost for P3
(in Nominal Price, in HK$ billions)
Extra financial resources acquired

4.18 The total extra financial resources acquired in each projection year have been decomposed by its sources (the government, companies and individuals)\(^57\):

- **Government**: Government injections.
- **Companies**: The 2.5% employers’ contribution to UPF with HK80,000 per month as ceiling on the maximum relevant income level would be included.
- **Individuals**: The 2.5% employers’ contribution to UPF with HK80,000 per month as ceiling on the maximum relevant income level would be included.

4.19 There are no MPF transfers required by P3. Hence the “opportunity cost” approach is not applicable here.

4.20 The results are plotted in Charts 4.6.

\(^57\) While "extra" financial resources may include investment income (positive or negative) and increases in unfunded liabilities, we only produce charts which concentrate on the three main contributors (the government, companies and individuals) of the system.
*With these projected extra financial resources for P3, the UPF balance would turn negative in 2036 and would leave a total UPF deficit balance of $116.7b (in 2013 constant dollar) in 2041.

Chart 4.6b  Projected Extra Financial Resources Acquired for P3

(in Nominal Price, in HK$ billions)
The Model, Assumptions and Results for P4

4.21 The proposal P4 is submitted by The Democratic Alliance for the Betterment and Progress of Hong Kong (民建聯). The Research Team follows the basic scheme specifications by the proposer.

4.22 This proposal does not require any contributions by individuals or companies. Neither lump sum injections from the government nor any increase in profit tax is needed. The system would be financed by the general annual government expenditure.

4.23 The P4 system aims to replace and strengthen the existing CSSA (Standard Rate), OALA and OAA programmes. The following table summarises the features of the existing programmes:

<table>
<thead>
<tr>
<th>Existing Programmes as of June 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>CSSA (Standard Rate)</td>
</tr>
<tr>
<td>OALA</td>
</tr>
<tr>
<td>OAA (70+)</td>
</tr>
</tbody>
</table>

4.24 The P4 scheme provides three levels of old-age pension to Hong Kong residents aged 65 or above. The amount of level III (OAPIII) is $3,405 per month for those with total assets less than $150,000; the amount of level II (OAPII) is $2,270 per month for those with total assets between $150,000 and $300,000; and the amount of level I (OAPI) is $1,135, and the asset test is not required in this level. The P4 feature is briefly described in the following table:

---

58 Throughout this technical report, the Research assumes that while an elderly CSSA recipient will still be able to receive supplements, the CSSA (Standard Rate) would be replaced by the new proposed OAPs.
<table>
<thead>
<tr>
<th>Name</th>
<th>Asset Limits</th>
<th>Allowance per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>OAPIII</td>
<td>≤$150,000</td>
<td>$3,405</td>
</tr>
<tr>
<td>OAPII</td>
<td>$150,000 to $300,000</td>
<td>$2,270</td>
</tr>
<tr>
<td>OAPI</td>
<td>≥$300,000</td>
<td>$1,135</td>
</tr>
</tbody>
</table>

4.25 The Research Team uses the Base Case Model in Chapter 1 for the existing system. If the P4 system were fully implemented, the following transition rates\(^{59}\) are assumed by the Research Team:

<table>
<thead>
<tr>
<th>Transition</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSSA (Standard) to OAP III</td>
<td>100%</td>
</tr>
<tr>
<td>OALA to OAPIII</td>
<td>80%</td>
</tr>
<tr>
<td>OALA to OAPII</td>
<td>20%</td>
</tr>
<tr>
<td>OAA (65-69) to OAPII</td>
<td>20%</td>
</tr>
<tr>
<td>OAA (65-69) to OAPI</td>
<td>80%</td>
</tr>
<tr>
<td>OAA(70+) to OAPIII</td>
<td>30%</td>
</tr>
<tr>
<td>OAA(70+) to OAPI</td>
<td>70%</td>
</tr>
</tbody>
</table>

4.26 The above transition rates are derived from the following working assumptions:

- The asset limit for current CSSA recipients is $39,500 while the P4 proposed asset limit for OAP III is $150,000; it is assumed that all (i.e., 100%) CSSA recipients will move to the new OAP III scheme for higher amount of benefits.
- The asset limit for current OALA recipients is $193,000 while the P4 proposed upper asset limits are $150,000 and $300,000 for OAP III and OAPII, respectively. The Research Team does not have the asset distribution data for the current OALA recipients. Since the OALA limit of $193,000 is much closer to the limit of OAPIII than that of OAPII, it is assumed that 80% of current OALA recipients will move to OAP III scheme, while the remaining 20% will move to OAP II plan.

\(^{59}\) The percentage of recipients who would move from the existing programme to the new scheme.
Under the current system Hong Kong residents with asset over $193,000 can apply for OAA if they are 70+. For those people who are 65-69 with asset over $193,000, it is assumed that 80% of them will enroll to OAP I scheme, while the remaining 20% will apply for OAP II scheme. For those people who are 70+ with asset over $193,000, it is likely that their asset amount is lower than that of the corresponding 65-69 group. Therefore, it is assumed that 70% of them will enroll to OAP I scheme, while the remaining 30% will apply for OAP II scheme.

4.27 Since the system is funded by the government. There is only one financial resource (government) and the annual amount matches the total cost (i.e., benefits payments without administrative cost) of the system.

4.28 The projected annual financial resources (same as total cost) for P4, both expressed in 2013 constant dollar and nominal prices, are plotted in Chart 4.7.

4.29 The projected exact financial resources acquired (same as exact cost) for P4, both expressed in 2013 constant dollar and nominal prices, are plotted in Chart 4.8.
Chart 4.7a  Projected Total Cost (Single Source from the Government) for P4

*(in 2013 Constant Dollar, in HK$ billions)*

Chart 4.7b  Projected Total Cost (Single Source from the Government) for P4

*(in Nominal Price, in HK$ billions)*
Chart 4.8a  Projected Extra Cost (Single Source from the Government) for P4

(in 2013 Constant Dollar, in HK$ billions)

Chart 4.8b  Projected Extra Cost (Single Source from the Government) for P4

(in Nominal Price, in HK$ billions)
The Model, Assumptions and Results for P5

4.30 The proposal P4 is submitted by The New People’s Party (新民黨). The Research Team follows the basic scheme specifications by the proposer.

4.31 This proposal does not require any contributions by individuals or companies. No lump sum injections from the government or any increase in profit tax is needed. The system would be financed as the general annual government expenditure.

4.32 Unlike P4, this proposal aims to give an additional protection while keeping the existing programmes. The P5 scheme suggests providing an amount (OAP) of $3,600 per month for those elderly people with total assets less than $100,000.

4.33 The Research Team uses the Base Case Model in Chapter 1 for the existing system. If the P5 system were fully implemented, the following transition rates are assumed by the Research Team:

<table>
<thead>
<tr>
<th>Transition</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSSA (Standard) to OAP</td>
<td>100%</td>
</tr>
<tr>
<td>OALA to OAP</td>
<td>50%</td>
</tr>
</tbody>
</table>

4.34 The above transition rates are derived from the following working assumptions:

- The asset limit for current CSSA recipients is $39,500 while the P5 proposed asset limit for OAP is $100,000; it is assumed that all (i.e., 100%) CSSA recipients will move to the new OAP scheme.
- The asset limit for current OALA recipients is $193,000 while the P4 proposed asset limits are $100,000 for OAP. It is assumed that half (50%) of the current OALA recipients will move to the new scheme.

4.35 The projected total cost (single source from the government) and extra cost to the government under P5 are given in Charts 4.9 and 4.10.
Chart 4.9a  Projected Total Cost (Single Source from the Government) for P5
(in 2013 Constant Dollar, in HK$ billions)

Chart 4.9b  Projected Total Cost (Single Source from the Government) for P5
(in Nominal Price, in HK$ billions)
Chart 4.10a  Projected Extra Cost (Single Source from the Government) for P5
(in 2013 Constant Dollar, in HK$ billions)

Chart 4.10b  Projected Extra Cost (Single Source from the Government) for P5
(in Nominal Price, in HK$ billions)
Main Findings

4.36 Affordability refers to the total and extra financial burden to individuals, companies and the government after the pension reform. There is no standard definition of affordable pension systems. The annual fund inflows to the UPF can be projected and they have been decomposed by sources (the government, companies and individuals) to examine how the financial burden is shared among different parties. If the UPF balance turns negative, it creates an unfunded liability and should be treated as a cost to the system.

4.37 The accumulated total financial resources (decomposed by sources) of various proposals for the entire study period (2013-41), in billions of 2013 constant Hong Kong dollars, are summarized in the Table 4.1. The net investment income (or expense) generated from the UPF is also included to maintain the accounting balance.

Table 4.1 Accumulated Total Financial Resources Requested by Various Proposals for the Entire Study Period, 2013-41 (in 2013 Constant Dollar)

<table>
<thead>
<tr>
<th>Proposal (Benefits Payment Period)</th>
<th>Government</th>
<th>Companies</th>
<th>Individuals</th>
<th>Investment Income*</th>
<th>Unfunded UPF balance** at 2041</th>
<th>Total Cost***</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 (2016-41)</td>
<td>1172</td>
<td>355</td>
<td>201</td>
<td>-7</td>
<td>249</td>
<td>1970</td>
</tr>
<tr>
<td></td>
<td>59%</td>
<td>18%</td>
<td>10%</td>
<td>-0.4%</td>
<td>-13%</td>
<td>100%</td>
</tr>
<tr>
<td>P2 (2013-41)</td>
<td>1004</td>
<td>763</td>
<td>459</td>
<td>106</td>
<td>-127</td>
<td>2206</td>
</tr>
<tr>
<td></td>
<td>46%</td>
<td>35%</td>
<td>21%</td>
<td>5%</td>
<td>-6%</td>
<td>100%</td>
</tr>
<tr>
<td>P3 (2017-41)</td>
<td>1008</td>
<td>460</td>
<td>453</td>
<td>22</td>
<td>117</td>
<td>2059</td>
</tr>
<tr>
<td></td>
<td>49%</td>
<td>22%</td>
<td>22%</td>
<td>1%</td>
<td>6%</td>
<td>100%</td>
</tr>
<tr>
<td>P4 (2013-41)</td>
<td>1398</td>
<td>100%</td>
<td>100%</td>
<td></td>
<td></td>
<td>1398</td>
</tr>
<tr>
<td>P5 (2013-41)</td>
<td>1190</td>
<td>100%</td>
<td>100%</td>
<td></td>
<td></td>
<td>1190</td>
</tr>
</tbody>
</table>

* Investment income of UPF, negative number indicates that the income earned during the entire period is not able to cover the financing cost of the negative balance over the same period. **Negative number indicates a positive funded UPF balance. ***The row sum may not exactly match this total due to minor rounding errors.
4.38 If we express the projected annual nominal total financial resources as a percentage of the projected nominal GDP amount for that year, the results for selected years are given in Table 4.2.

Table 4.2a Projected Annual Nominal Total Financial Resources as a Percentage of the Projected Nominal GDP (Year 2021)

<table>
<thead>
<tr>
<th></th>
<th>Government</th>
<th>Companies</th>
<th>Individuals</th>
<th>Investment Income</th>
<th>Amount of Decrease in UPF Balance</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>1.21%</td>
<td>0.64%</td>
<td>0.41%</td>
<td>0.04%</td>
<td>0.03%</td>
<td>2.32%</td>
</tr>
<tr>
<td>P2</td>
<td>1.02%</td>
<td>1.10%</td>
<td>0.67%</td>
<td>0.16%</td>
<td>-0.50%</td>
<td>2.44%</td>
</tr>
<tr>
<td>P3</td>
<td>1.02%</td>
<td>0.78%</td>
<td>0.77%</td>
<td>0.06%</td>
<td>-0.15%</td>
<td>2.49%</td>
</tr>
<tr>
<td>P4</td>
<td>1.53%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.53%</td>
</tr>
<tr>
<td>P5</td>
<td>1.28%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.28%</td>
</tr>
</tbody>
</table>

Table 4.2b Projected Annual Nominal Total Financial Resources as a Percentage of the Projected Nominal GDP (Year 2031)

<table>
<thead>
<tr>
<th></th>
<th>Government</th>
<th>Companies</th>
<th>Individuals</th>
<th>Investment Income</th>
<th>Amount of Decrease in UPF Balance</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>1.43%</td>
<td>0.55%</td>
<td>0.35%</td>
<td>-0.01%</td>
<td>0.76%</td>
<td>3.08%</td>
</tr>
<tr>
<td>P2</td>
<td>1.38%</td>
<td>0.94%</td>
<td>0.56%</td>
<td>0.17%</td>
<td>0.18%</td>
<td>3.24%</td>
</tr>
<tr>
<td>P3</td>
<td>1.38%</td>
<td>0.66%</td>
<td>0.65%</td>
<td>0.05%</td>
<td>0.56%</td>
<td>3.29%</td>
</tr>
<tr>
<td>P4</td>
<td>2.04%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.04%</td>
</tr>
<tr>
<td>P5</td>
<td>1.72%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.72%</td>
</tr>
</tbody>
</table>

Table 4.2c Projected Annual Nominal Total Financial Resources as a Percentage of the Projected Nominal GDP (Year 2041)

<table>
<thead>
<tr>
<th></th>
<th>Government</th>
<th>Companies</th>
<th>Individuals</th>
<th>Investment Income</th>
<th>Amount of Decrease in UPF Balance</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>1.62%</td>
<td>0.49%</td>
<td>0.31%</td>
<td>-0.14%</td>
<td>1.03%</td>
<td>3.31%</td>
</tr>
<tr>
<td>P2</td>
<td>1.60%</td>
<td>0.85%</td>
<td>0.50%</td>
<td>0.09%</td>
<td>0.43%</td>
<td>3.48%</td>
</tr>
<tr>
<td>P3</td>
<td>1.60%</td>
<td>0.59%</td>
<td>0.58%</td>
<td>-0.06%</td>
<td>0.83%</td>
<td>3.54%</td>
</tr>
<tr>
<td>P4</td>
<td>2.28%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.28%</td>
</tr>
<tr>
<td>P5</td>
<td>2.00%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.00%</td>
</tr>
</tbody>
</table>
4.39 Expressing the projected annual nominal total cost share by the government as a percentage of the projected nominal total government expenditure (base case - no service enhancement scenario) for that year, the average results over the study period are given in Table 4.3.

Table 4.3 Projected Annual Nominal Total Financial Resources Shared by Government as a Percentage of the Projected Nominal Government Total Expenditure (Average Figures*)

<table>
<thead>
<tr>
<th>Government</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>7.5%</td>
</tr>
<tr>
<td>P2</td>
<td>6.0%</td>
</tr>
<tr>
<td>P3</td>
<td>7.0%</td>
</tr>
<tr>
<td>P4</td>
<td>8.4%</td>
</tr>
<tr>
<td>P5</td>
<td>7.2%</td>
</tr>
</tbody>
</table>


4.40 Some components of the total projected cash inflows to the UPF in each year would be incurred with or without the pension reform. In order to examine the “marginal” financial implications by the proposal, these “extra” financial resources acquired are also studied.

4.41 The accumulated “extra” financial resources required by various proposals for the entire study period (2013-41), in billions of 2013 constant Hong Kong dollars, are presented in Table 4.4a using the “Out-of-Pocket” approach.

4.42 For P1 and P2, there are MPF transfers contributed by employers to the UPF. If such transfers are re-classified as employees’ extra financial requirement, the results for P1 and P2 are given in Table 4.4b (“Opportunity Cost” approach).
Table 4.4a Accumulated “Extra” Financial Resources Required by Various Proposals for the Entire Study Period, 2013-41 (Out-of-Pocket Approach, in 2013 Constant Dollar)

<table>
<thead>
<tr>
<th></th>
<th>Government</th>
<th>Companies</th>
<th>Individuals</th>
<th>Investment Income</th>
<th>UPF balance at 2041</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>274</td>
<td>229</td>
<td>201</td>
<td>-7</td>
<td>-249</td>
</tr>
<tr>
<td>P2</td>
<td>50</td>
<td>321</td>
<td>459</td>
<td>106</td>
<td>+127</td>
</tr>
<tr>
<td>P3</td>
<td>131</td>
<td>460</td>
<td>453</td>
<td>22</td>
<td>-117</td>
</tr>
<tr>
<td>P4</td>
<td>444</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5</td>
<td>235</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.4b Accumulated “Extra” Financial Resources Required by Various Proposals for the Entire Study Period 2013-41 (Opportunity Cost Approach, in 2013 Constant Dollar)

<table>
<thead>
<tr>
<th></th>
<th>Government</th>
<th>Companies</th>
<th>Individuals</th>
<th>Investment Income</th>
<th>UPF balance at 2041</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>274</td>
<td>229</td>
<td>327</td>
<td>-7</td>
<td>-249</td>
</tr>
<tr>
<td>P2</td>
<td>50</td>
<td>321</td>
<td>902</td>
<td>106</td>
<td>+127</td>
</tr>
</tbody>
</table>
A Comparison of P1 to P5

4.43 We consider the annual financial resources of the pension system as the fund inflows each year to the UPF, plus the amount of increase in unfunded UPF balance (in case of the balance turned negative). On the other hand, the annual total cost of the system is the total expenditure (i.e., cash outflows) of that year.

4.44 In this section we compare proposals P1 to P5 by combining the results in Charts 4.1 to 4.10.

4.45 It should be cautioned that these five proposals have quite different characteristics and they might not be directly comparable. For examples, the benefits payment period for P1 is 2016-41; P3 is 2017-41, while P2, P4 and P5 are 2013-41. Furthermore, the projected UPF balance is +$127b in 2041 for P2, whilst the projected balances for P1 and P3 are negative at the end of the study period.
Financial Resources and Total Cost (ALL)

Chart 4.11a(i)  Projected Total Financial Resources (in 2013 Constant Dollar, in HK$ billions)

*Excluding unfunded liabilities and investment income

Chart 4.11a(ii)  Projected Annual Total Cost (in 2013 Constant Dollar, in HK$ billions)
Chart 4.11b(i)  Projected Total Financial Resources for P1-P5 (in Nominal Price, in HK$ billions)

*Excluding unfunded liabilities and investment income

Chart 4.11b(ii)  Projected Total Cost for P1-P5 (in Nominal Price, in HK$ billions)
Chart 4.11c(i)  Projected Nominal Total Financial Resources for P1-P5, Expressed as Percentage of Projected Nominal GDP

*Excluding unfunded liabilities and investment income

Chart 4.11c(ii)  Projected Nominal Total Cost for P1-P5, Expressed as Percentage of Projected Nominal GDP
Financial Resources (Government)

Chart 4.12a  Projected Total Financial Resources (from Government) for P1-P5
(in 2013 Constant Dollar, in HK$ billions)

Chart 4.12b  Projected Nominal Total Financial Resources (from Government) for P1-P5,
Expressed as
Percentage of Projected Nominal GDP using Base Scenario
Financial Resources (Companies)

Chart 4.13a  Projected Total Financial Resources (from Companies) for P1-P5
(in 2013 Constant Dollar, in HK$ billions)

Chart 4.13b  Projected Nominal Total Financial Resources (from Companies) for P1-P5,
Expressed as
Percentage of Projected Nominal GDP using Base Scenario
Financial Resources (Individuals)

Chart 4.14a  Projected Total Financial Resources (from Individuals) for P1-P5
(in 2013 Constant Dollar, in HK$ billions)

Chart 4.14b  Projected Nominal Total Financial Resources (from Individuals) for P1-P5,
Expressed as
Percentage of Projected Nominal GDP using Base Scenario
Total financial liability (increases in unfunded UPF Balance) – The UPF balances of P1 and P3 are projected to turn negative in year 2030 and 2036, respectively. The financial liabilities generated each year thereafter for these two proposals are plotted in the following charts.

Chart 4.15a  Projected Total Financial Liability for P1 and P3
(in 2013 Constant Dollar, in HK$ billions)

Chart 4.15b  Projected Total Financial Liability for P1 and P3, Expressed as
Percentage of Projected Nominal GDP using Base Scenario
Extra financial resources acquired (ALL)

Chart 4.16a  Projected Extra Financial Resources Acquired for P1-P5

(in 2013 Constant Dollar, in HK$ billions)

*Excluding unfunded liabilities and investment income

Chart 4.16b  Projected Total Extra Financial Resources Acquired for P1-P5, Expressed as Percentage of Projected Nominal GDP using Base Scenario

*Excluding unfunded liabilities and investment income
Extra financial resources acquired (Decomposed by Sources)

*Chart 4.17a Projected Extra Financial Resources Acquired (from Government) for P1-P5*

*(in 2013 Constant Dollar, in HK$ billions)*
Chart 4.17b(i) Projected Extra Financial Resources Acquired (from Companies) for P1-P5
(Out-of-Pocket Approach, in 2013 Constant Dollar, in HK$ billions)

Chart 4.17b(ii) Projected Extra Financial Resources Acquired (from Companies) for P1-P5
(Opportunity Cost Approach, in 2013 Constant Dollar, in HK$ billions)
Chart 4.17c(i) Projected Extra Financial Resources Acquired (from Individuals) for P1-P5
(Out-of-Pocket Approach, in 2013 Constant Dollar, in HK$ billions)

Chart 4.17c(ii) Projected Extra Financial Resources Acquired (from Individuals) for P1-P5
(Opportunity Cost Approach, in 2013 Constant Dollar, in HK$ billions)
**Limitations**

4.46 The objective of this chapter is to examine the total amount of financial resources required and acquired by each proposal and analyse how the latter is shared by individuals, private sectors and the government. The shares of “financial burden” among different parties are proxied by the cash inflows and unfunded liabilities (if any, created by negative UPF balances) to the system.

4.47 For proposals P1 to P3, the projected future UPF balances would be very different. For proposals with structural deficits, the policies of financing such shortfalls might affect the “financial burden” to be shared by individuals, private sectors and the government in future. In the absence of such policies, the comparison results in this chapter should be interpreted with cautions.
Conclusion

Adequacy, sustainability, affordability and robustness are the four primary goals of pension reforms defined by the World Bank. This report aims to provide a quantitative framework for assessing the selected proposals in the main report based on the primary goals. Such information should facilitate a better understanding of the financial arrangement of the selected proposals in the main report and the factors that influence costs, and thus contribute to an informed discussion of issues related to the finances of the proposals.

It should be noted that the results in this technical report are based on assumptions concerning uncertain future events and outcomes and that the eventual experience will most likely differ, possibly materially, from that indicated in the projections.
Appendix 1

Eligibility Requirements of existing Social Security Schemes for Elderly in Hong Kong

This study covers the following Social Security Schemes for elderly in Hong Kong:

- Comprehensive Social Security Assistance (CSSA),
- Old Age Living Allowance (OALA),
- Old Age Allowance (OAA),
- Normal Disability Allowance (NDA) and
- Higher Disability Allowance (HDA).

Eligibility Requirements

Comprehensive Social Security Assistance (CSSA)

- The applicant must be a Hong Kong resident, have held the Hong Kong resident status for not less than one year; and have resided in Hong Kong for at least one year (since acquiring the Hong Kong resident status to the date prior to the date of application). The one-year residence need not be continuous or immediately before the date of application. Absence(s) from Hong Kong up to a maximum of 56 days (whether continuous or intermittent) before the date of application is/are treated as residence in Hong Kong;

- The applicant must pass both the income and asset tests.

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60 With reference to the information available in Social Welfare Department website.
Old Age Living Allowance (OALA)

- Aged 65 or above and is having an income and assets not exceeding the prescribed limits;
- has been a Hong Kong resident for at least seven years and has resided in Hong Kong continuously for at least one year immediately before the date of application (absence from Hong Kong up to a maximum of 56 days during the one-year period is treated as residence in Hong Kong);
- continues to reside in Hong Kong;
- is not in receipt of any other allowance under the Scheme or assistance under the Comprehensive Social Security Assistance Scheme;
- is not being detained in legal custody or admitted to a penal institution.

Old Age Allowance (OAA)

- Aged 70 or above;
- has been a Hong Kong resident for at least seven years and has resided in Hong Kong continuously for at least one year immediately before the date of application (absence from Hong Kong up to a maximum of 56 days during the one-year period is treated as residence in Hong Kong);
- continues to reside in Hong Kong;
- is not in receipt of any other allowance under the Scheme or assistance under the Comprehensive Social Security Assistance Scheme;
- is not being detained in legal custody or admitted to a penal institution.

Normal Disability Allowance (NDA) and Higher Disability Allowance (HDA)

- has been a Hong Kong resident for at least seven years and has resided in Hong Kong continuously for at least one year immediately before the date of application (absence from Hong Kong up to a maximum of 56 days during the one-year period is treated as residence in Hong Kong);
- continues to reside in Hong Kong;
• is not in receipt of any other allowance under the Scheme or assistance under the Comprehensive Social Security Assistance Scheme;
• is not being detained in legal custody or admitted to a penal institution;
• For Normal Disability Allowance (NDA), he/she is certified by the Director of Health or the Chief Executive, Hospital Authority (or under exceptional circumstances by a registered medical practitioner of a private hospital) to be severely disabled; and his/her disabling condition will persist for at least 6 months.
• For Higher Disability Allowance (HDA), in addition to meeting the eligibility criteria for Normal Disability Allowance above, he/she must be certified by the Director of Health or the Chief Executive, Hospital Authority (or under exceptional circumstances by a registered medical practitioner of a private hospital) to be in need of constant attendance from others in his/her daily life; and he/she is not receiving care in residential institutions subsidized by the government (including subsidized places in subvented/contract homes and residential care homes under various bought place schemes) or all public hospitals and institutions under the Hospital Authority, or boarding in special schools under the Education Bureau.
Appendix 2 (for Chapter 2): Charts for Main Results and Sensitivity Analysis

Main Results

Chart 2.1a Replacement Rates under P0: Status Quo (Baseline Assumptions)
Chart 2.1b Relative Pension Levels under P0: Status Quo (Baseline Assumptions)

Chart 2.2a Replacement Rates under P1: 工聯會 (Baseline Assumptions)
Chart 2.2b Relative Pension Levels under P1: 工聯會 (Baseline Assumptions)

Chart 2.3a Replacement Rates under P2: 爭取全民退保聯席 (Baseline Assumptions)
Chart 2.3b Relative Pension Levels under P2: 爭取全民退保聯席 (Baseline Assumptions)

Chart 2.4a Replacement Rates under P3: 公共專業聯盟 (Baseline Assumptions)
Chart 2.4b Relative Pension Levels under P3: 公共專業聯盟 (Baseline Assumptions)

Chart 2.5a Replacement Rates under P4: 民建聯 (Baseline Assumptions)
Chart 2.5b Relative Pension Levels under P4: 民建聯 (Baseline Assumptions)

Chart 2.6a Replacement Rates under P5: 新民黨 (Baseline Assumptions)
Chart 2.6b Relative Pension Levels under P5: 新民黨 (Baseline Assumptions)

Chart 2.7a Replacement Rates under P6: 羅致光 (Baseline Assumptions)
Chart 2.7b Relative Pension Levels under P6: 羅致光 (Baseline Assumptions)
P3: Public Professional Alliance 2013 (MEN) --- Baseline

Multiple of Median Earnings vs Gross Relative Pension Level

- Pillar 0
- Pillar 1
- Pillar 2
- Pillar 3
- Pillar 4

P3: Public Professional Alliance 2013 (MEN) --- Baseline

Multiple of Median Earnings vs Net Relative Pension Level

- Pillar 0
- Pillar 1
- Pillar 2
- Pillar 3
- Pillar 4

P3: Public Professional Alliance 2013 (WOMEN) --- Baseline

Multiple of Median Earnings vs Gross Relative Pension Level

- Pillar 0
- Pillar 1
- Pillar 2
- Pillar 3
- Pillar 4

P3: Public Professional Alliance 2013 (WOMEN) --- Baseline

Multiple of Median Earnings vs Net Relative Pension Level

- Pillar 0
- Pillar 1
- Pillar 2
- Pillar 3
- Pillar 4
Sensitive Analysis and Alternative Models

Different Career Lengths

2.16 A full career length of 40 years has been assumed in the baseline model. Following the OECD study, various individual career lengths should be examined under the sensitive analysis. In this report, the Research Team considered 30 years and 15 years (The MPF system started in December 2000, almost 15 years from now).

2.17 The figures in the last subsection show that the results for “Gross” and “Net” replacement rate computations in Hong Kong are very similar, possibly due to the low and simple personal tax system in Hong Kong. Therefore, for convenience, only the “net” rates are reported in the next subsections.
Chart 2.8 Results for various proposals with career lengths 30 or 15 years
P1: 工聯會 2013 (MEN) --- Career 30yrs

P1: 工聯會 2013 (WOMEN) --- Career 30yrs

P1: 工聯會 2013 (MEN) --- Career 15yrs

P1: 工聯會 2013 (WOMEN) --- Career 15yrs
Different Investment Rate of Returns

2.18 A 2% real rate of investment return on the MPF system is assumed in the baseline model. It is a rounded figure from the difference between the assumed nominal long-term investment rate of return (5%) and the assumed annual price inflation (3.1%) per year.

2.19 Historically, the annualised internal rates of return on the MPF schemes have been fairly volatile. Chart 2.9 displays the nominal annualised internal rates of return (net of fees and charges) since inception of the MPF system. The overall rate of return over the period from December 2000 (inception of the MPF system) to December 2013 is around 4.4% per annum.

2.20 The Hong Kong investment environment has gone through ups and downs in the past 13 years or so. For sensitivity analysis, the Research Team examined two additional real rates of return assumptions on the MPF schemes in this study. They are 1.5% and 2.5%. The results are plotted in Charts 2.9.

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**Annualized Internal Rate of Return of the MPF System**

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61 Source of data: Mandatory Provident Fund Schemes Statistics Digest (December 2013), MPFA.
Chart 2.9 Results for various proposals with $i=1.5\%$ or $i=2.5\%$
P5: 新民黨 2013 (MEN) --- i=1.5%

P5: 新民黨 2013 (WOMEN) --- i=1.5%

P5: 新民黨 2013 (MEN) --- i=2.5%

P5: 新民黨 2013 (WOMEN) --- i=2.5%
Gender-neutral annuity factors

2.21 In the computation of retirement-income indicators, an individual’s accumulated pension wealth at retirement will be converted into annual income streams using gender-based annuity factors, following the OECD pension model.

2.22 On 1 March 2011, the European Court of Justice ruled that European insurance companies will no longer be able to base the price of annuities on gender\(^\text{62}\). Later on 13 January 2012, the European Commission issued a guidance confirming that gender-based pricing will only apply to private pensions in Europe that are separate from an employment relationship. Gender-based pricing of annuities is lawful in European occupational pension schemes where this is justified by actuarial factors\(^\text{63}\).

2.23 To the best knowledge of the Research Team, Hong Kong does not have a similar law in this aspect. The impact of the European Court of Justice ruling to Hong Kong is yet to be known.

2.24 For illustrative purpose, the Research Team computed the retirement-income indicators using gender-neutral annuity factors\(^\text{64}\). The results are displayed in Charts 2.10.

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\(^{62}\) In the case of Test-Achats, C-236/09, OJ C130, 30.4.2011, p.4.


\(^{64}\) Gender-neutral annuity factors are obtained by weighted average of gender-based factors, where the weights are determined by the 2013 age-sex specific population projections published by the Census and Statistics Department of the Hong Kong Government.
Chart 2.10 Results for various proposals with unisex annuity factors
The offsetting Arrangement

2.25 Under the current regulations, employers are allowed to offset their severance payments and long service payments against MPF accrued benefits arising from the employers’ contribution.

2.26 The labour sector is worried that the offsetting mechanism would result in a level of MPF accrued benefits not sufficient for employees’ retirement protection.\(^{65}\)

2.27 The Research Team does not have the historical statistics on frequencies and amounts of actual offsetting cases. For sensitive analysis in this study, the Research Team examined two scenarios for illustrative purposes. These two scenarios are: (1) 50% of employers’ contributions in the MPF account have been used for offsetting; and (2) an extreme case of 100% of employers’ contributions in the MPF account have been used for offsetting.

2.28 The results are graphed in Charts 2.11.

\(^{65}\) See para. 6 of Legislative Council Panel on Financial Affairs and Panel on Manpower: The arrangement of offsetting severance payments and long service payments against Mandatory Provident Fund accrued benefits, LC Paper No. CB(2)1034/13-14(01).
Chart 2.11 Results for various proposals with different MPF offsetting percentage