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ASSESSMENT OF THE LONG TERM IMPLICATIONS OF THE HEALTH PROTECTION SCHEME

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

Overview

1. The Health Protection Scheme ("HPS", "the Scheme") comprises a Protection Scheme and a Savings Scheme. These Schemes are defined and discussed in the "Feasibility Study on the Key Features of the Health Protection Scheme" ("the Feasibility Study"). This report does not repeat this information; as such, this report should be reviewed after reading the Feasibility Study report. Note that the report entitled "Local Market Situation and Overseas Experience of Private Health Insurance and Analyses of Stakeholders' Views" may also provide useful background in understanding this report.

2. This report examines the potential enrolment in the Scheme under various scenarios, and examines the impact of the Scheme on public and private health care providers, public and private health expenditure, the private health insurance ("PHI") industry, as well as the economy in general.

3. Our assessment involves projections from 2011 to 2036, assuming the Scheme is introduced in 2012. The projections for 2011 are intended to illustrate the current health care system, prior to implementation of the Scheme.

Projected Scheme Membership

4. We looked at a range of penetration scenarios, illustrated graphically in Exhibit 1, together with the Baseline scenario, which is the projected penetration rate without the Scheme.

5. The projections show a declining penetration rate in the long run because the penetration rate at the older ages is relatively low and Hong Kong's population is anticipated to age significantly over time. Exhibit 2 compares the penetration rates based on the 2008 Thematic Household Survey against the projected 2036 penetration rates under the various scenarios.

Exhibit 1: Projected PHI penetration rates under different scenarios

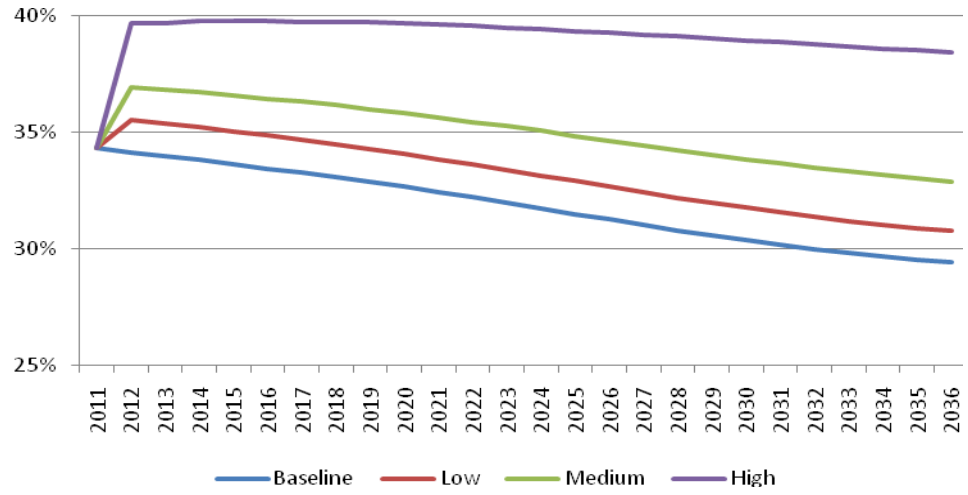
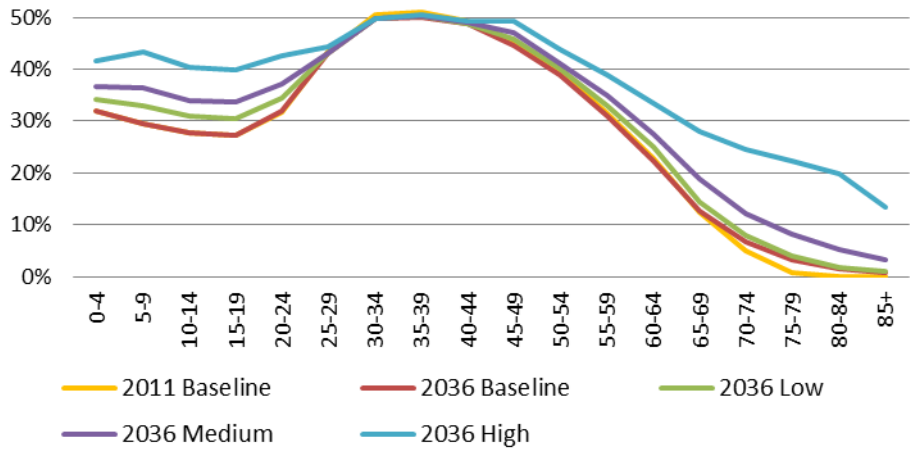


Exhibit 2: PHI penetration rates by age group



6. After taking into account income levels, we believe the penetration rates at the working ages is already relatively high and if there is to be any significant improvement in penetration rates, it will have to come from the older ages. The Scheme facilitates this by providing products that are guaranteed renewable for life, monitoring premium rates increases and putting in place control knobs that encourage transparency and competitiveness of private health care providers and private health insurers.

7. We believe that the High penetration scenario will only be achievable if the government provides meaningful savings incentives that help alleviate the high

cost of PHI at the older ages. Otherwise, the tendency for retired policyholders to lapse their PHI policies and fall back to the Hospital Authority will likely continue.

8. Provided the Scheme has the support of insurance companies and intermediaries, we project anywhere between 650,000 to almost two million members will join the Scheme in the year it is introduced (see Exhibit 3), varying with the attractiveness of the incentives provided by the government and market response.

Exhibit 3: Projected Scheme and non-Scheme insured populations ('000s)

		2011	2012	2016	2021	2026	2031	2036
Baseline	Scheme	0	0	0	0	0	0	0
	Non-Scheme	2,456	2,463	2,494	2,526	2,531	2,524	2,523
	Total	2,456	2,463	2,494	2,526	2,531	2,524	2,523
Low	Scheme	0	648	1,429	1,540	1,608	1,646	1,668
	Non-Scheme	2,456	1,916	1,170	1,096	1,037	994	970
	Total	2,456	2,563	2,599	2,636	2,645	2,640	2,639
Medium	Scheme	0	1,282	1,884	1,948	1,990	2,012	2,020
	Non-Scheme	2,456	1,382	833	828	815	803	801
	Total	2,456	2,663	2,717	2,776	2,805	2,815	2,821
High	Scheme	0	1,973	2,159	2,279	2,382	2,461	2,507
	Non-Scheme	2,456	890	805	806	798	789	789
	Total	2,456	2,863	2,964	3,085	3,180	3,250	3,296

9. We expect most of the members will come from existing PHI policyholders migrating to the Scheme (see Exhibit 3). Because the existing PHI penetration rate is already quite high, we expect the number of new PHI policyholders will be relatively limited. We estimate between 100,000 to 400,000 new PHI policyholders in the first year the Scheme is introduced, depending on the level of government incentives and market response.

Impact of Scheme

10. Impact of the Scheme is essentially the marginal impact by matching the projection results in various penetration scenarios with those in the Baseline scenario without the Scheme in place. Our Baseline scenario projects that total, public and private health expenditure and utilisation would all show a secular uptrend in the long run mainly due to population aging and medical inflation.

The marginal impact of the Scheme should be read as the change in their growth thus resulted.

11. Private health expenditure is projected to increase at almost the same rate over and above GDP as total and public health expenditure during 2011-2036, although it hovered at around the same % of GDP except in more recent years.

12. With greater penetration of PHI, we expect a shift of hospital admissions from HA to private hospitals, as those with PHI cover tend to mostly use private hospitals rather than HA hospitals, while the converse is true of those without PHI cover. The Scheme is projected to successfully reduce HA's share of overall admissions, but the impact will only be material if the PHI penetration rate itself is improved materially, particularly at the older ages in an aging population, as illustrated in the High penetration scenario.

Exhibit 4: Projected HA vs. private hospital "admissions" ('000s)

		2011	2012	2016	2021	2026	2031	2036
Public	Baseline	1,080	1,103	1,203	1,340	1,481	1,636	1,793
	Low	1,080	1,096	1,198	1,334	1,474	1,628	1,786
	Medium	1,080	1,089	1,185	1,315	1,449	1,598	1,752
	High	1,080	1,073	1,157	1,270	1,385	1,513	1,646
Private	Baseline	303	307	322	340	356	372	388
	Low	303	327	352	371	389	406	422
	Medium	303	347	374	398	421	442	461
	High	303	382	415	457	500	543	581
Public % Total	Baseline	78%	78%	79%	80%	81%	81%	82%
	Low	78%	77%	77%	78%	79%	80%	81%
	Medium	78%	76%	76%	77%	78%	78%	79%
	High	78%	74%	74%	74%	73%	74%	74%

13. Associated with the shift of HA admissions to private hospitals is slower growth in public health expenditure than the Baseline scenario, or lower projected public health expenditure compared with the Baseline scenario ("nominal substitution" of government expenditure by private expenditure). Nevertheless, this effect is offset by government incentives to attract members to purchase PHI; in particular in the Medium and High penetration scenarios which allow for incentives in the form of premium rebates in the order of 40%-60% of premium for members who maintain their coverage beyond the age of 65.

14. Overall, although the Scheme is projected to provide some marginal relief to public health expenditure, it would result in almost negligible change in total government expenditure as the reduction in public health expenditure (due to reduction in utilisation of public health care services) is readily offset by provision of government incentives. In other words, the government turns out to spend more or less the same. This is illustrated in Exhibit 5, noting that the figures cover a projection period of twenty five years; the impact per annum is not material.

Exhibit 5: Projected cumulative impact of Scheme on government expenditure (Cumulative for years 2012-2036) (HK$ million in 2010 prices)

	Low	Medium	High
Increase in Government Financial Outflow			
Premium discount for new joiners	93	180	280
Injection into High Risk Pool	13	52	1,666
Scheme supervision	1,100	1,100	1,100
Subtotal	1,206	1,332	3,046
Decrease in Government Financial Outflow			
Nominal substitution of public health expenditure	-5,927	-27,352	-85,071
Net Financial Outflow without Savings Incentives	-4,721	-26,020	-82,026
Savings Incentive			
Cost of savings incentives	0	22,264	71,082
Additional Scheme supervision for savings components	0	314	314
Net Financial Outflow with Savings Incentives, where applicable	-4,721	-3,442	-10,629

15. The Scheme effect is similarly modest in the context of total health expenditure (see Exhibit 6). With the shift in hospital admissions from public to private, we project that total health expenditure would register a modest increase because we envisage that medical inflation in the private sector would outpace that in the public sector, which is consistent with the assumptions adopted in the government health expenditure projection. However, the increase is mostly modest because the projected increase in penetration rates is similarly modest, and the Scheme for the most part covers only hospital inpatient care, which makes up around 30% of total health expenditure. Still, total health expenditure are expected to increase modestly. Also, the design of the Scheme would encourage greater shift in utilisation from inpatient care to ambulatory care for procedures that could be conducted in outpatient settings. The latter incurs lower average cost per procedure.

16. The shift in hospital admissions from public to private would also mean a corresponding shift between public and private service. This effect can be manifested by the breakdown of total health expenditure by expenditure incurred on the services in the public and private sectors (see Exhibit 6).

Exhibit 6: Projected impact of Scheme on health expenditure by provider (% change)

		2011	2012	2016	2021	2026	2031	2036
Public Sector	Lower	0.0%	0.0%	-0.2%	-0.2%	-0.3%	-0.2%	-0.2%
	Medium	0.0%	0.0%	-0.7%	-1.0%	-1.1%	-1.2%	-1.3%
	High	0.0%	0.0%	-1.9%	-2.6%	-3.3%	-4.0%	-4.5%
Private Sector	Lower	0.0%	0.9%	1.0%	1.1%	1.1%	1.1%	1.1%
	Medium	0.0%	1.7%	2.2%	2.6%	3.0%	3.3%	3.5%
	High	0.0%	3.5%	4.6%	6.2%	7.9%	9.5%	10.8%
Total	Lower	0.0%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
	Medium	0.0%	0.9%	0.7%	0.8%	0.8%	0.9%	0.9%
	High	0.0%	1.7%	1.3%	1.6%	2.0%	2.4%	2.6%

17. We do note that the impact can be significant to the private sector, and this is more clearly illustrated in the projected demand for private hospital beds under the different scenarios (see Exhibit 7). Under the High penetration scenario, we project an additional 3,476 private beds will be required, more than three times the number without the Scheme. There are currently around 3,800 private hospital beds in Hong Kong.

Exhibit 7: Projected cumulative private provider capacity required

		2011	2012	2016	2021	2026	2031	2036
Private Beds	Baseline	-	43	236	461	660	859	1,057
	Low	-	298	610	852	1,070	1,281	1,483
	Medium	-	546	883	1,188	1,466	1,734	1,979
	High	-	990	1,393	1,923	2,458	2,995	3,476
Doctors	Baseline	-	11	62	121	172	222	274
	Low	-	81	164	228	285	340	393
	Medium	-	149	239	319	393	463	527
	High	-	270	379	523	668	812	942
Nurses	Baseline	-	39	218	426	605	780	963
	Low	-	284	576	802	1,003	1,198	1,385
	Medium	-	522	838	1,119	1,380	1,625	1,851
	High	-	945	1,327	1,833	2,343	2,849	3,305

Sensitivity Analyses

18. We have examined the sensitivity of the projection results to changes in assumptions. This is important because there are significant uncertainties in the assumptions, especially as the projections are over a 25-year period and actual results may be significantly different than the assumptions made.

19. We have looked at variations in different assumptions pertaining to:

- Anti-selection and cost of the unhealthy or high risk lives joining the Scheme
- Public and private medical inflation rates
- Ability to control private medical costs and level of abuse in the system
- The generosity of savings incentives provided
- Insured members' use of private vs. HA hospitals

20. Because the impact of the Scheme on most elements of the health care system is not significant (in particular the impact on the health expenditure), the impact of varying the assumptions for such elements is also mostly not significant.

21. The impact of the Scheme on government expenditure is marginally favourable in that the savings from the nominal substitution is slightly greater than cost of the savings incentives (the one exception is where the Medium penetration scenario achieved without having to provide any savings incentives).

22. There are scenarios with a few changes in assumptions in which the impact of the Scheme on the government expenditure would become marginally more favourable and marginally unfavourable, such as:

- A Lower Baseline scenario: Modifying the Baseline scenario so that the existing penetration rates of old ages are assumed to remain "as-is" in the projection period, as opposed to the original baseline, where the old ages' penetration are projected to be slightly improving. Viewing it from the lapse rate perspective, the average lapse rate for age 65 and above under Lower Baseline scenario is over 25% vs. the 14% assumed under the original baseline scenario. The reduction in net government financial outflow would be around HK$ 6 billion (cumulative for 25 years) larger than originally projected in the Medium Penetration scenario.

- A Higher Baseline scenario: On the opposite, if we were to use the Low penetration scenario as the Baseline, i.e. higher penetration rate than the original baseline, then the impact on net government financial outflow would differ by roughly HK$ 6 billion (cumulative for 25 years), turning from a modest reduction in the originally projected in the Medium Penetration scenario to a modest increase.

Economic and Other Implications

23. Overall, consistent with the financial projections illustrated thus far, the impact of the Scheme is not expected to be significant.

24. The precise impact of the Scheme on the macroeconomic aggregates such as GDP and private consumption expenditure are difficult to quantify with acceptable level of precision. The major constraint rests with uncertainty in predicting the changes in dynamic consumption and savings behaviours of people affected by the Scheme. Even then, the reallocation of savings to the Scheme would also have some implications on the economy.

25. Nevertheless, the impact of the Scheme on the private insurance and health care sectors would potentially be substantial. For both sectors, the Scheme would present additional business opportunities by inducing greater service demand. Taking the private health care sector as an example, under the High penetration scenario, by 2036, the Scheme would help to increase the number of private admissions and ambulatory procedures per annum by 193,000 and create around 6,800 jobs in the private medical industry, compared to without the Scheme. The design of the Scheme would also foster market development in these two sectors by promoting market transparency and competition.

26. There are also broader implications. Provided there is sufficient competition amongst private health care providers and private insurers, the Scheme has the potential to create a more balanced public-private health care system. It has the potential to create a platform where there are sufficient control knobs to foster sustained and effective growth of the private health care and PHI industry. If Hong Kong has a private market that has the confidence of the government and the public, then the broader benefits may be numerous, such as:

- The government should have more options as to how it can structure the delivery of care to the lower income populations, i.e. options that include the private sector.

- A private sector that offers quality care at an acceptable price could play a role in helping Hong Kong maintain its competitiveness as a destination setting up high value-added businesses.

- A more dynamic and vibrant private medical industry could lead to further product and process innovations, making Hong Kong a regional "centre of excellence."

27. The Scheme being an incentivised Scheme with underlying policy objectives presents regulatory challenges to ensure that the desired objectives can be met without jeopardising business environment and consumer interests. We have illustrated the challenges and proposed a supervisory structure in the Feasibility Study report (Chapter 5).

Conclusions

28. Although there is significant uncertainty in the projections, the results of the projections including the sensitivity analyses suggest the impact of the Scheme on the health care system is marginally positive. Its impact on the private insurance and health care sectors could be significant if penetration rates approach the High scenario. The government could also provide (although not significant) material relief to HA's patient load and the government expenditure, especially if the Medium penetration scenario can be achieved without the use of savings incentives; we do not think the High penetration scenario can be achieved without the use of savings incentives.

29. In addition there are also broader economic implications. For the private health insurance and health care sectors, the Scheme carries long-term positive significance by not only stimulating the market demand but also fostering market development and enhancing consumer confidence. For the economy as a whole, soundness of public finance is an important factor underlying economic fundamentals. If the challenge of health care financing cannot be well tackled, there would inevitably be adverse implications for sustainability of the health care system, long-term public finance and macroeconomic stability.

30. We would recommend that the Scheme be implemented in two phases, with the Protection Scheme implemented first and the Savings Scheme implemented later. This would allow the government time to monitor the performance of the Protection Scheme first and iron out any teething issues. It could then implement the Savings Scheme later, tweaking the level of savings incentives in response to penetration rates and customer profiles resulting from Phase 1.

SECTION 1: INTRODUCTION

Background

The Food and Health Bureau ("FHB") has commissioned a series of studies to devise a proposal for a feasible incentivised voluntary Health Protection Scheme ("HPS", "the Scheme"), guided by the policy direction in the Chief Executive's Policy Address 2009-10 to propose a supplementary health care financing option based on voluntary participation with insurance and savings components for the second stage public consultation on health care reform. .

Milliman Limited ("Milliman") has been appointed by FHB to carry out "Assessment of the Long-term Implications of the Health Protection Scheme."

The aim of this study is examine the potential enrolment in the Scheme under various scenarios, and examine the impact of the Scheme on public and private health care providers, public and private health expenditure, the private health insurance ("PHI") industry, as well as the economy in general.

Our assessment includes quantitative projections from 2011 to 2036, as well as qualitative commentary.

Approach

In performing our assessment and deriving our conclusions, we have relied on:

- The experience of Milliman in Hong Kong, the region, and selected countries from around the world

- Information from the "Local Market Situation and Overseas Experience of Private Health Insurance and Analyses of Stakeholders' Views" and "Feasibility Study on the Key Features of the Health Protection Scheme" ("the Feasibility Study"), which includes:

- Research on the experience of PHI from around the world, the Hong Kong PHI market, and the views of the various stakeholders in the Hong Kong health care system.

- The design of the Scheme, as documented in the Feasibility Study report.

- Invaluable input from several committees, including:

  - Health and Medical Development Advisory Committee ("HMDAC") and Health Care Financing Working Group under HMDAC
  - Consultative Group on Voluntary Supplementary Financing Scheme
  - Task Force on Voluntary Supplementary Financing Scheme
  - FHB

- Information and views from various stakeholders in the Hong Kong health care system, in particular, the Hospital Authority ("HA"), the Census and Statistics Department, the Hong Kong Federation of Insurers, and a few private hospitals.

Organisation of This Report

Section 2 of this report examines the key results of the projections. In particular, it looks at the impact of the Scheme assuming different levels of enrolment under different scenarios.

The projections assume the Scheme is implemented in 2012. 2011 reflects our estimate of the current environment, prior to the implementation of the Scheme.

Sections 3 and 4 look at the sensitivity of the projections to changes in assumptions, other than enrolment. It is important for the reader to understand how using different assumptions impact the projected outcomes because there is significant uncertainty when performing 25-year projections.

To make the sensitivity analyses more meaningful and more readily digestible, we have organised it from the perspective of different stakeholders:

- Section 3: Provider capacity; which would be mostly of interest to health care service providers, the medical association and the government for planning purposes

- Section 4: Government expenditure; which would be mostly of interest to the government

- Section 5: Total health expenditure; which would be of interest to the government, and also stakeholders in general and academics.

Section 6 looks at the broader implications of the HPS including economic and other dimensions.

The methodology and assumptions for the projections are described in Appendices A and B respectively.

In writing this report, we have assumed that the reader would also have read the Feasibility Study report. The report entitled "Local Market Situation and Overseas Experience of Private Health Insurance and Analyses of Stakeholders' Views" may also be useful in understanding the rationale for the HPS as proposed.

Limitations

Milliman does not intend to benefit any third party recipient of its work product or create any legal duty from Milliman to a third party even if Milliman consents to the release of its work product to such third party.

In order to understand and rely upon Milliman's work, this report must be read in its entirety. All recipients of the Milliman report should understand that the Milliman work product is a complex, technical analysis, and that Milliman recommends all recipients be aided by their own actuary or other qualified professional when reviewing the Milliman work product.

In this study, we project the Scheme impact from 2011 until 2036. As with all assignments of this nature, there is significant uncertainty in projecting events that will unfold over the next twenty five years or more. It is likely that actual results will vary from our projections, perhaps significantly. In particular, given the dynamic

nature of health care, the actual experience will vary with numerous factors, including:

- The general economic condition
- The length of waiting time at HA
- The supply of private providers
- The patients perception of the quality of HA vs. private providers
- Changes in medical technology and utilisation patterns

In addition, there is significant uncertainty in setting the assumptions at the extreme elderly ages, e.g. ages 85 and above. There is no existing insured experience at these ages. We had to supplement Hong Kong experience with overseas experience. We have also referenced the experience of HA, but even HA experience is based on a very small population, in particular with regards to males aged 85 and above.

We have relied on data from various sources. We have not audited this information and in many cases are not able to verify this information against an independent source. In particular, we have relied on the following information:

- Detailed utilisation and cost data from HA
- Hong Kong Residential Population: 2006-based population projection from Census and Statistics Department
- Excerpts from the 2008 Thematic Household Survey conducted by Census and Statistics Department ("2008 THS")
- Private hospital admissions data from the Department of Health

The latest 2009-based population projections were not used for this study as other statistics (for example, public health expenditure and GDP) corresponding to the latest population projections are not available. We have not evaluated the impact of the difference in the population base on the projections in this study.

The above information forms an integral part of our calculations. If this information is inaccurate or incomplete, then our projections may likewise be inaccurate or incomplete.

SECTION 2: PROJECTED SCHEME MEMBERHIP AND FINANCIAL IMPACT

Introduction

This section of the report looks at the impact of the Scheme if the Scheme is successful in increasing the proportion of lives covered by PHI ("penetration rate").

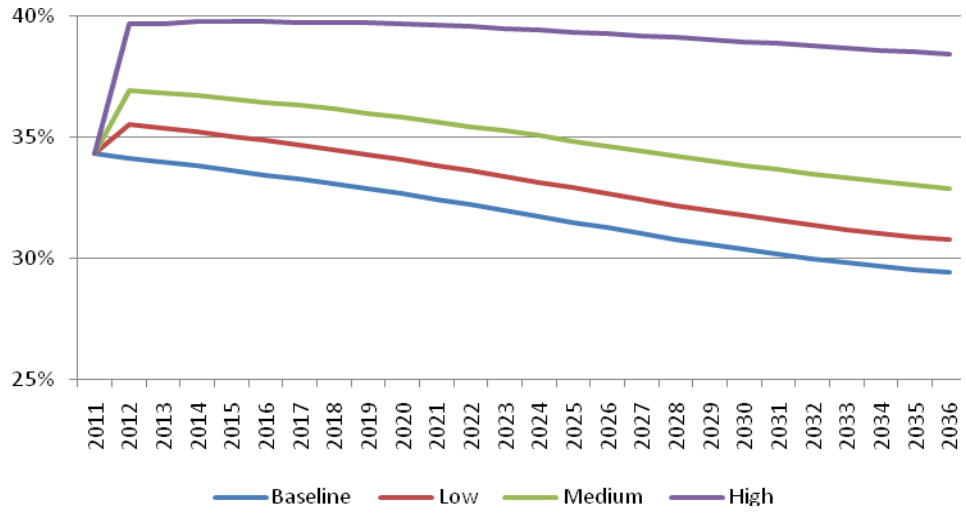
In particular we look at the impact of the Scheme on:

- Public-private admissions
- Private hospital beds and manpower
- Government expenditure
- Total health expenditure

Penetration Scenarios

We look at a range of penetration scenarios, illustrated graphically in Exhibit 2.1. The projections assume the Scheme is implemented in 2012. 2011 reflects our estimate of the current environment, prior to the implementation of the Scheme.

Exhibit 2.1: Projected PHI penetration rates under different scenarios



The projections show a declining penetration rate in the long run because the penetration rate at the older ages is extremely low and the population is projected to age over time. We discuss each of these scenarios further below.

The penetration rates correspond to the projected Scheme and non-Scheme insured populations in Exhibits 2.2a through 2.2d.

Exhibit 2.2a: Baseline Scenario - Projected Scheme and non-Scheme insured populations ('000s)

		2011	2012	2016	2021	2026	2031	2036
Scheme	**Total**	-	-	-	-	-	-	-
	Individual	-	-	-	-	-	-	-
	Group Only	-	-	-	-	-	-	-
Non Scheme	**Total**	2,456	2,463	2,494	2,526	2,531	2,524	2,523
	Individual	1,590	1,596	1,624	1,655	1,669	1,671	1,671
	Group Only	866	867	870	871	862	853	853
Grand Total		2,456	2,463	2,494	2,526	2,531	2,524	2,523
Penetration Rate		34%	34%	33%	32%	31%	30%	29%

Note: The figures for "Individual" also cover those with both individual and group insurance coverage.

Exhibit 2.2b: Low Scenario - Projected Scheme and non-Scheme insured populations ('000s)

		2011	2012	2016	2021	2026	2031	2036
Scheme	**Total**	-	648	1,429	1,540	1,608	1,646	1,668
	Individual	-	615	1,396	1,507	1,575	1,614	1,636
	Group Only	-	33	33	33	32	32	32
Non Scheme	**Total**	2,456	1,916	1,170	1,096	1,037	994	970
	Individual	1,590	1,081	332	258	207	173	150
	Group Only	866	835	837	839	830	821	821
Grand Total		2,456	2,563	2,599	2,636	2,645	2,640	2,639
Penetration Rate		34%	36%	35%	34%	33%	32%	31%

Note: The figures for "Individual" also cover those with both individual and group insurance coverage.

Exhibit 2.2c: Medium Scenario - Projected Scheme and non-Scheme insured populations ('000s)

		2011	2012	2016	2021	2026	2031	2036
Scheme	**Total**	-	1,282	1,884	1,948	1,990	2,012	2,020
	Individual	-	1,216	1,819	1,883	1,925	1,948	1,956
	Group Only	-	65	65	65	65	64	64
Non Scheme	**Total**	2,456	1,382	833	828	815	803	801
	Individual	1,590	579	28	22	17	14	12
	Group Only	866	802	805	806	798	789	789
Grand Total		2,456	2,663	2,717	2,776	2,805	2,815	2,821
Penetration Rate		34%	37%	36%	36%	35%	34%	33%

Note: The figures for "Individual" also cover those with both individual and group insurance coverage.

Exhibit 2.2d: High Scenario - Projected Scheme and non-Scheme insured populations ('000s)

		2011	2012	2016	2021	2026	2031	2036
Scheme	**Total**	-	1,973	2,159	2,279	2,382	2,461	2,507
	Individual	-	1,908	2,094	2,214	2,317	2,397	2,443
	Group Only	-	65	65	65	65	64	64
Non Scheme	**Total**	2,456	890	805	806	798	789	789
	Individual	1,590	87	0	0	0	0	0
	Group Only	866	802	805	806	798	789	789
Grand Total		2,456	2,863	2,964	3,085	3,180	3,250	3,296
Penetration Rate		34%	40%	40%	40%	39%	39%	38%

Note: The figures for "Individual" also cover those with both individual and group insurance coverage.

The penetration rates are driven by assumptions of the number of new lives insured and the persistency rate of those who purchase PHI, i.e. the proportion of lives who maintain their PHI cover instead of lapsing it. These assumptions are summarised in Exhibit 2.3 and we discuss each of these key assumptions further below.

Exhibit 2.3: Summary of enrolment and persistency assumptions

	Penetration Scenario			
	Baseline	**Low**	**Med**	**High**
Source of Scheme members at outset				
Existing Individuals	-	500,000	1,000,000	1,500,000
Group underinsured*	-	25%	50%	50%
Previously uninsured individuals	-	100,000	200,000	400,000
Lapse rates				
Scheme	High	High	Med	Low
Non-Scheme	High	High	High	High

Note: (*) 25% and 50% pertain to around 32,500 people and 65,000 people respectively.

We have not explicitly modelled group PHI that provide adequate coverage to employees because the existing terms and conditions are generally already consistent with Scheme products, or stated more accurately, most of the proposed changes to terms and conditions (e.g. guaranteed renewal for life) are not applicable to group insurance. Whether group insurance is modelled as a Scheme product or existing PHI product will not impact the financial projections. However, this does not mean we do not think these employers should not participate in the Scheme. On the contrary, we recognise that the Scheme should enrol as many members as possible so that all the negotiations and infrastructure involving insurers, providers, and regulators relate to a meaningful number of members. The development of the Scheme infrastructure may

seem a waste of resources if for example, say, ultimately there are only a few hundred thousand members.

The range of scenarios examined is intended to illustrate what we consider to be a relatively wide range of outcomes, although actual experience could extend beyond this range. In general, the High scenario is something that may be difficult to achieve unless the government provides substantial incentives for the elderly to purchase PHI, although we cannot quantify what is "substantial." The Low penetration scenario represents a very marginal achievement and is harmful to the government financial outcome if the government provides material incentives with this result; the penetration rate only increases by 1% point.

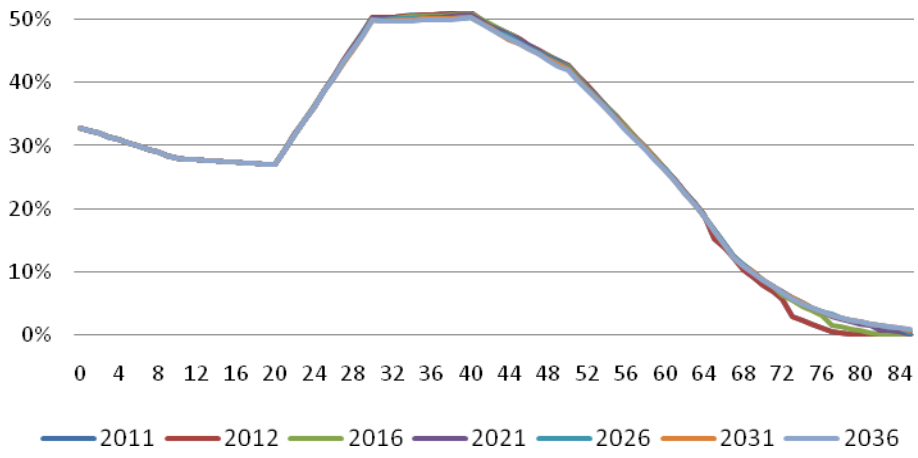
We discuss some of the key penetration assumptions below.

Baseline

The Baseline scenario represents existing penetration rates, as per the 2008 THS. In addition, about half the major insurance companies have introduced individual PHI products that give policyholders the right to renew their policies for his or her lifetime ("guaranteed lifetime cover"), while in the past perhaps virtually all PHI products in the market limited coverage to ages 65 to 75. We expect this extension of coverage to older ages within PHI will improve the penetration rates slightly at the older ages and have reflected this in the Baseline projections (see Exhibit 2.4).

We examine impact of using different Baseline scenarios in Section 4.

Exhibit 2.4: Projected overall PHI penetration by age over time: Baseline scenario



Uninsured individuals

We illustrate the possibility of between 100,000 to 400,000 previously uninsured lives joining the Scheme.

The figure of 400,000 broadly comes from:

- Identifying what we think are the relevant target group, including a proportion of individuals with monthly incomes above $10,000 and a proportion of the elderly who may not be drawing an income, but may have the means to pay the Scheme premium.

- Looking at the implied PHI penetration rate for this population, which we estimate is as high as 90%-100% for the main working ages with monthly income levels greater than $10,000.

- Applying this same level of penetration to the portion of the relevant target group that have not yet purchased PHI, which may be considered an optimistic assumption.

  To give the reader a feel for why this may be optimistic, we draw an analogy to insurance companies who try to sell insurance products to credit card customers. Usually, they will profile the credit card customer database and identify the relevant customers. When they first contact these credit card customers, they may perhaps be able to convince, say, 10% of them to purchase a particular insurance product. If they were to do a second round of marketing, we would not expect them to be able to get another 10% of the remaining relevant credit customers to purchase the product, since they have already refused to purchase the product the first time.

  In other words, the insurance companies have achieved a degree of success in selling PHI products to the population. It will be difficult for the Scheme to achieve similar levels of penetration amongst the relevant population (i.e. those above a certain income level) who currently have decided not to purchase PHI; at least probably not without significant government incentives to do so.

The Low Scenario figure of 100,000 broadly represents what we think many would consider to be a lacklustre outcome corresponding to the incentives used and promotional efforts of the Scheme and the government. As a reference, according to

the 2005 and 2008 Thematic Household Surveys, the number of insured lives increased from 2.2 million to 2.4 million, without any of the level of publicity and potential government incentives being considered for the HPS.

The medium penetration scenario is simply a middle ground between the Low and High scenarios.

Individuals with existing PHI

According to the 2008 THS, at the moment, there are around 1.6 million individuals with individual PHI designed to cover actual medical expenses, as opposed to paying fixed benefits regardless of the actual medical costs.

The Scheme is designed so that almost all of these existing PHI products would qualify as a Scheme product with some amendment to the terms and conditions (e.g. to provide guaranteed renewal for life and cover pre-existing conditions) and perhaps some minor modifications to the benefit design (e.g. coverage of chemotherapy, if not already covered by the existing policy).

Provided the government continues to engage the insurers in developing the product design and gains the support of the insurers and the intermediaries, the migration of existing individual PHI policyholders to the Scheme could be as simple as "renewing" the existing product into the Scheme. For this reason, we assume 500,000 to be a readily achievable target while 1.5 million would be considered an over-whelming success.

Under-insured groups

Based on conversations with a number of industry practitioners, we roughly estimate that perhaps around 15% - 20% of the total employees currently with PHI provided by employers are actually under-insured. We define under-insured as health plans that covers less than $500 per day in hospital for room and board costs and consequently the majority of these employees go to HA when they require inpatient treatment.

We project that 25% to 50% of these employees, i.e. around 32,500 to 65,000 employees, will upgrade to the Base Scheme product in the Low to High penetration scenarios.

Lapse rates

The projected penetration rate is also a product of whether those who join the Scheme will stay on the Scheme.

We look at a range of lapse rates (i.e. the likelihood that a policyholder will leave the Scheme):

- High lapse. This reflects lapse experience on insurance products that provide protection against adverse events (such as high medical expenses and accidents), but do not include a savings component (e.g. a maturity value at the end of a 20-year policy period). These products typically have policy terms of one year, and the policyholder has to make a conscious decision to renew the policy at the end of each year. The lapse rates on these policies are relatively high.

- Low lapse. This reflects lapse experience on long-term savings products. Often, there is some form of penalty if the policyholder lapses the policy, especially early in the policy term. Most policyholders maintain the policy until the policy matures. The lapse rates are relatively low.

  Lapse rates under the Scheme could be lower than this, but it would probably require substantial financial incentives from the government.

- Medium lapse. This is an average of the Low and High lapse rates.

The lapse rates are illustrated in Appendix B.

Impact of Scheme

To assess the impact of the Scheme, we refer to the marginal impact by matching the projection results in various penetration scenarios with those in the Baseline scenario without the scheme in place. Since our Baseline scenario projects that total, public and private health expenditure and utilisation would all show a secular uptrend in the long run due to population ageing and medical inflation, the marginal impact of the Scheme should be read as the change in their growth thus resulted.

Private health expenditure is projected to increase at almost the same rate over and above GDP as total and public health expenditure during 2011-2036, although it hovered at around the same % of GDP except in more recent years.

The impact of the Scheme could potentially be significant because, based on a combination of PHI claims experience and HA and private hospital admission data, we estimate that those with PHI more often use private hospitals, while those who do not have PHI rely mostly on HA hospitals. Getting more individuals to purchase PHI should therefore shift more admissions from HA to the private sector. This is particularly the case for the old ages who have a higher inclination to use public service (see Exhibit B2 in Appendix B), so that putting old-age lapse rate under better control is very important.

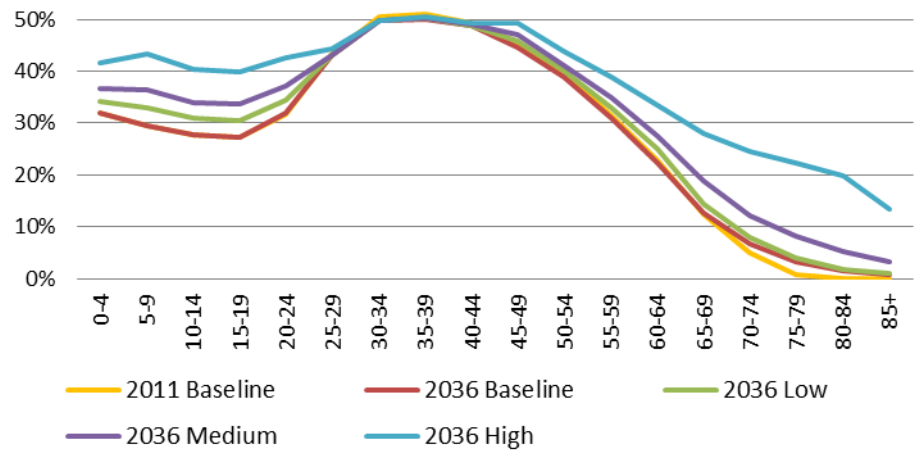
However, the overall impact of the Scheme is projected to be potentially material, but not substantial because:

- The penetration rate of PHI at working ages for individuals with monthly incomes of $10,000 or higher is already high. Any increase in penetration at these ages would be marginal.

- Potentially the most significant increase in penetration would be at the older ages, post-retirement. However, because the user fees of HA is so low, it would probably require significant financial incentives from the government in order to encourage those with PHI at the working ages to maintain their PHI cover at the older ages (where premiums are relatively expensive) rather than fall back on HA.

- Even when using the Low lapse assumptions, the penetration rate at the older ages is still relatively low, and the penetration rate at the older ages still only increases from 6% under the Baseline scenario to 23% under the High penetration scenario. Exhibit 2.5 compares the penetration rates based on the 2008 Thematic Household Survey against the projected 2036 penetration rates under the various scenarios

Exhibit 2.5: PHI penetration rates by age group in different scenarios



The follow exhibits summarise the impact of the Scheme on different aspects of the Hong Kong health care system.

Public-private admissions

Exhibit 2.6 illustrates the projected number of "admissions" in HA and private hospitals and the HA share of total "admissions." "Admissions" include the majority of cases labelled as "day patients" at HA hospitals and ambulatory procedures in the private sector, which, in principle, we consider to be procedures that may be performed in a hospital inpatient setting, but can be safely performed in an outpatient or ambulatory setting.

Exhibit 2.6: Projected HA vs. private hospital "admissions" ('000s)

		2011	2012	2016	2021	2026	2031	2036
Public	Baseline	1,080	1,103	1,203	1,340	1,481	1,636	1,793
	Low	1,080	1,096	1,198	1,334	1,474	1,628	1,786
	Medium	1,080	1,089	1,185	1,315	1,449	1,598	1,752
	High	1,080	1,073	1,157	1,270	1,385	1,513	1,646
Private	Baseline	303	307	322	340	356	372	388
	Low	303	327	352	371	389	406	422
	Medium	303	347	374	398	421	442	461
	High	303	382	415	457	500	543	581
Public % Total	Baseline	78%	78%	79%	80%	81%	81%	82%
	Low	78%	77%	77%	78%	79%	80%	81%
	Medium	78%	76%	76%	77%	78%	78%	79%
	High	78%	74%	74%	74%	73%	74%	74%

The utilisation levels and choice of public-private hospitals for each age-gender is assumed to be the same throughout the projection period in each scenario. The increase in number of admissions is mainly due to the growth and aging of the population. In the Low penetration scenario, we project a small shift of admissions from HA to private hospitals, as there will be only a small increase in people covered with medical coverage, i.e. majority of population are still uninsured and tend to use public services. In the High penetration scenario, the number of HA admissions is still projected to increase materially; however, there is a higher shift of admissions from HA to private sector, increasing the number of admission in the private sector significantly.

Waiting time in public hospitals

The shift in hospital admissions from public to private would relieve HA's patient load, particularly for the elective and less expensive procedures that the Base Plan covers fully or most of the private hospital charges and even for more complex medical conditions to the extent the public are willing to purchase more expensive Top-up plans. However, it is difficult to estimate the impact on the waiting time in public hospitals with acceptable level of precision because while the Scheme will shift patient loads from the HA to private sector, we would expect some HA doctors will follow the patients and also shift to the private sector. The waiting times for the remaining HA patients will depend on HA patient to doctor ratio after the shift, whether productivity levels are unchanged, and most importantly, the supply of additional doctors in the long term.

Private hospital beds and manpower

Exhibit 2.7 summarises the projected cumulative number of additional private hospital beds required. 2011 reflects the existing environment, while 2012 onward reflects the impact of the Scheme. For example, under the Baseline scenario, we estimate Hong Kong will roughly require an additional 1,000 private hospital beds in 2036 compared to 2011, while under the High penetration Scheme, almost 3,500 additional private hospital beds would be required.

Exhibit 2.7: Projected cumulative number of additional private hospital beds required

		2011	2012	2016	2021	2026	2031	2036
Private Beds	Baseline	-	43	236	461	660	859	1,057
	Low	-	298	610	852	1,070	1,281	1,483
	Medium	-	546	883	1,188	1,466	1,734	1,979
	High	-	990	1,393	1,923	2,458	2,995	3,476

Exhibit 2.8 summarises figures in a similar format for the cumulative number of private specialists and nurses required.

Exhibit 2.8: Projected cumulative number of additional private specialists and nurses required

		2011	2012	2016	2021	2026	2031	2036
Doctors	Baseline	-	11	62	121	172	222	274
	Low	-	81	164	228	285	340	393
	Medium	-	149	239	319	393	463	527
	High	-	270	379	523	668	812	942
Nurses	Baseline	-	39	218	426	605	780	963
	Low	-	284	576	802	1,003	1,198	1,385
	Medium	-	522	838	1,119	1,380	1,625	1,851
	High	-	945	1,327	1,833	2,343	2,849	3,305

The projected number of private specialists required may be under-estimated in that it assumes that the doctors are operating at a "mature" level of productivity. In practice, it takes perhaps around three years, if not longer, for a specialist entering private practice to build up her or his clientele. We look at the impact of different productivity assumptions on the required manpower requirements in Section 3.

Government expenditure

Exhibit 2.9 illustrates the impact of the Scheme on the government expenditure under the Medium penetration scenario. The impact is measured relative to the Baseline scenario. Overall, although the Scheme is projected to provide some marginal relief to public health expenditure, it would result in almost negligible change in total government expenditure (in the context of a 25-year period) as the reduction in public health expenditure (due to reduction in utilisation of public health care services) is readily offset by provision of government incentives. In other words, the government turns out to spend more or less the same. We examine the impact of adopting alternative Baseline assumptions in Section 4.

- Premium discount of new joiners. This is the cost to the government of providing the "30% No Claim Discount Free Pass" discussed in the Feasibility Study report. Those currently without PHI cover would start at the 30% No Claims Discount level upon joining the Scheme. Those with existing individual PHI cover migrating to the Scheme would also start at the 30% No Claim Discount level, provided that they have not made a claim in the previous 12 months.

- The cost of no claim discount is spread over 2012 to 2014, but the majority of the costs are incurred in 2012, the year the Scheme is launched. Overall, the cost to the government is estimated to be around $180 million or around 5% of total individual Scheme premiums in 2012.

Exhibit 2.9: Projected impact of Scheme on government expenditure - Medium Penetration Scenario (HK$ million in 2010 prices)

	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
Increase in Government Financial Outflow								
Premium discount for new joiners	0	126	0	0	0	0	0	180
Injection into HRP	0	24	1	0	0	0	0	52
Scheme supervision	0	35	37	41	45	50	55	1,100
Subtotal	0	185	39	41	45	50	55	1,332
Decrease in Government Financial Outflow								
Nominal substitution of public HE	0	0	-479	-824	-1,213	-1,650	-2,148	-27,352
Net Financial Outflow without Savings Incentives	0	185	-441	-783	-1,167	-1,600	-2,093	-26,020
Savings Incentive								
Cost of savings incentives	0	118	334	624	1,005	1,412	1,768	22,264
Additional Scheme supervision for savings components	0	10	11	12	13	14	16	314
Net Financial Outflow with Savings Incentives, where applicable	0	313	-96	-148	-149	-174	-309	-3,442

- Injection into High Risk Pool ("HRP"). This is the projected government injection of money considered necessary to maintain the viability of the HRP and the Scheme. The HRP is supported by premiums paid by high risk individuals (capped at three times the standard premium) and HRP reinsurance premiums paid by the insurers into the HRP. If, for example, there is significant anti-selection occurring across the Scheme and a disproportionate number of high risk individuals join the Scheme, then the HRP reinsurance premiums will need to be increased to support the Scheme. However, at some point, the higher HRP reinsurance premiums may compromise the Scheme's ability to compete with the open market to attract health individuals to purchase PHI on an ongoing basis. We have assumed the HRP reinsurance threshold where the Scheme starts to become uncompetitive to be 2% (based on overseas experience), although actual experience in Hong Kong will depend on several factors including the relative profit margins of Scheme vs. open market products and the degree of price elasticity. Ultimately, the timing of the government's involvement would depend on how the situation unfolds, but in principle, the role of the government is to support the HRP to maintain the competitiveness and long-term viability of the Scheme relative to the open market.

- Scheme supervision. This refers to the operating costs of body that will supervise or regulate the Scheme. This is assumed to be $35 million in 2012 increasing with inflation, if the Scheme does not involve a savings component. If it involves a savings component, we assume there will be additional supervisory costs of around $10 million in 2012 if the savings incentives take the form of premium rebates (the "High Degree of Freedom" option mentioned in the Feasibility Study report). If, instead this involves formal savings vehicles, then we would expect most of the supervision of the savings products would lie with the Insurance Authority and/or the Mandatory Provident Funds Authority; we have not investigated the additional supervisory costs if a formal savings structure is put in place.

- Nominal substitution of public health expenditure. With an aging population, public health expenditure is projected to increase. To the extent that some of the projected HA admissions are shifted to the private sector, then the increase in public health expenditure would be lower than would otherwise be the case.

- Cost of savings incentives. We assume the savings incentives will take the form of premium rebates at the older ages. We assume everyone still enrolled in the Scheme after age 65 will receive a 40% and 60% premium rebate under

Medium and High penetration scenarios, respectively. In practice, only those who have been members for 20 to 25 years (i.e. they joined at age 40 to 45 or earlier) would receive this level of rebate. Those joining later (i.e. with a shorter membership history) would receive proportionally lower rebates. In this sense, our projections err on the side of conservatism.

Exhibits 2.10a through 2.10d summarise the impact on the Low and High penetration scenarios on the various key elements of the projected government expenditure related to the Scheme.

Exhibit 2.10a: Projected increase in government expenditure, without savings incentives (HK$ million in 2010 prices)

	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
Lower								
Premium discount for new joiners	0	64	0	0	0	0	0	93
Injection into HRP	0	11	0	0	0	0	0	13
Scheme supervision	0	35	37	41	45	50	55	1,100
Total	0	110	37	41	45	50	55	1,206
Medium								
Premium discount for new joiners	0	126	0	0	0	0	0	180
Injection into HRP	0	24	1	0	0	0	0	52
Scheme supervision	0	35	37	41	45	50	55	1,100
Total	0	185	39	41	45	50	55	1,332
High								
Premium discount for new joiners	0	198	0	0	0	0	0	280
Injection into HRP	0	73	79	82	71	54	25	1,666
Scheme supervision	0	35	37	41	45	50	55	1,100
Total	0	306	116	123	116	104	80	3,046

Exhibit 2.10b: Projected nominal substitution of public health expenditure (HK$ million in 2010 prices)

	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
Low	0	0	-134	-213	-272	-319	-370	-5,927
Medium	0	0	-479	-824	-1,213	-1,650	-2,148	-27,352
High	0	0	-1,243	-2,256	-3,615	-5,392	-7,611	-85,071

Exhibit 2.10c: Projected government expenditure related to savings incentives (HK$ million in 2010 prices)

	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
Medium								
Cost of savings incentives	0	118	334	624	1,005	1,412	1,768	22,264
Additional Scheme supervision for savings components	0	10	11	12	13	14	16	314
Total	0	128	345	636	1,018	1,426	1,784	22,578
High								
Cost of savings incentives	0	303	788	1,712	3,059	4,750	6,580	71,082
Additional Scheme supervision for savings components	0	10	11	12	13	14	16	314
Total	0	313	798	1,723	3,072	4,765	6,596	71,396

The savings incentives are not applicable to the Low penetration scenario because we would expect penetration rates to be higher than that illustrated in the Low scenario if the government provides incentives for members to save for post-retirement premiums.

Exhibit 2.10d: Projected net increase in government expenditure, with savings incentives where applicable (HK$ million in 2010 prices)

	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
Low excluding savings incentives	0	110	-96	-172	-227	-269	-314	-4,721
Medium excluding savings incentives	0	185	-441	-783	-1,167	-1,600	-2,093	-26,020
Medium including savings incentives	0	313	-96	-148	-149	-174	-309	-3,442
High including savings incentives	0	620	-329	-410	-426	-524	-934	-10,629

The most significant cash flow items are the nominal substitution and savings incentives. The best-case scenario illustrated is where the Scheme is able to achieve Medium penetration levels, the associated shift in HA admissions to private hospitals and nominal substitution without the government having to offer any savings incentives. However, even in this scenario the Scheme would also be able to reduce the government expenditure by around HK$26 billion over a period of 25 years, i.e. on average HK$1 billion a year.

We do note that in all cases, the Scheme is projected to alleviate the increase in government spending, albeit not materially.

Total Health Expenditure

The scheme effect is similarly modest in the context of total health expenditure (see Exhibit 2.11). With the shift in hospital admissions from public to private, we project that total health expenditure would register a modest increase because we envisage that medical inflation in the private sector would outpace that in the public sector, which is consistent with the assumptions adopted in the government health expenditure projection. However, the increase is mostly modest because the projected increase in penetration rates is similarly modest, and the Scheme in most part covers only hospital inpatient care, which makes up around 30% of total health expenditure. Still, total health expenditure are expected to increase modestly. Also, the design of the Scheme would encourage greater shift in utilisation from inpatient care to ambulatory care for procedures that could be conducted in outpatient settings. The latter incurs lower average cost per procedure.

The shift in hospital admissions from public to private would also mean a corresponding shift between public and private service. This effect can be manifested by the breakdown of total health expenditure by expenditure incurred on the services in the public and private sectors.

Exhibit 2.11: Projected impact of Scheme on health expenditure by provider (% change)

		2011	2012	2016	2021	2026	2031	2036
Public Sector	Lower	0.0%	0.0%	-0.2%	-0.2%	-0.3%	-0.2%	-0.2%
	Medium	0.0%	0.0%	-0.7%	-1.0%	-1.1%	-1.2%	-1.3%
	High	0.0%	0.0%	-1.9%	-2.6%	-3.3%	-4.0%	-4.5%
Private Sector	Lower	0.0%	0.9%	1.0%	1.1%	1.1%	1.1%	1.1%
	Medium	0.0%	1.7%	2.2%	2.6%	3.0%	3.3%	3.5%
	High	0.0%	3.5%	4.6%	6.2%	7.9%	9.5%	10.8%
Total	Lower	0.0%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
	Medium	0.0%	0.9%	0.7%	0.8%	0.8%	0.9%	0.9%
	High	0.0%	1.7%	1.3%	1.6%	2.0%	2.4%	2.6%

Apart from the reason of only modest increases in PHI penetration rates, the impact of the Scheme on overall health expenditure is projected to be negligible because the Scheme mostly covers hospital inpatient care, which makes up only around 30% of overall health care spending.

Total health expenditure is projected to increase mainly because private medical inflation[1] (assumed to be 4.7% in 2012, before consideration of volume growth, then reducing for the next ten years before increasing again until the end of the projection period[2]) is expected to exceed public medical inflation (public medical inflation is assumed to be consistently 0.8 % points lower than private medical inflation). We look at alternative inflation assumptions in Section 5.

[1] Rise in unit medical cost over and above general price inflation. .
[2] This pattern of decreasing and then increasing inflation is consistent with the long-term working assumptions provided by the government.

SECTION 3: SENSITIVITIES ANALYSES - PRIVATE PROVIDER CAPACITY

Introduction

The following sensitivity analyses look at the impact of changing various key assumptions on the projections. We have used the Medium penetration scenario as the reference for illustrating the sensitivity of the results to specific assumptions. Our intention is not to illustrate the projected outcomes for all different combinations of possible assumptions but to provide the reader with an understanding of which are the key assumptions and how they impact the results.

Private Hospital Beds

Exhibit 3.1: Impact of higher occupancy rate and lower proportion of ambulatory procedures on projected cumulative number of private hospital beds

Additional Number of Beds	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
"Medium" Penetration Scenario								
65% Occupancy Rate with 25% Ambulatory	0	455	50	49	46	43	39	1,649
Sensitivity (Difference from "Medium" Penetration Scenario)								
85% Occupancy Rate with 25% Ambulatory	0	-107	-12	-12	-11	-10	-9	-390
65% Occupancy Rate with 10% Ambulatory	0	91	10	9	9	9	8	330

The occupancy rate at private hospitals is currently around 65%. Based on Milliman's proprietary databases covering 750,000 insured lives, the mix of hospital inpatient (i.e. with overnight stay) and ambulatory procedures (with a recorded hospital admission, but not requiring an overnight stay) is around 90:10. At HA, the mix is closer to 75:25 (counting most of what is classified as Day Patients as "ambulatory procedures" and excluding specialist outpatient procedures that appear to be extremely minor procedures). The Medium penetration scenario assumes a mix of 75:25, i.e. similar to HA, as the Scheme explicitly covers ambulatory procedures;

under the Scheme. Unlike current PHI, members would not need to be admitted into a hospital just to have the procedure covered by the insurer.

We examine alternative assumptions:

- Occupancy rate of 85%, which reduces the projected number of private hospital beds required. Hospitals can operate safely at an occupancy rate of 85% to accommodate higher patient loads, at least over short periods of time.

- Mix of hospital inpatient and ambulatory procedures of 90:10. This reflects the scenario where the Scheme is unable to change the current situation, where there is a tendency for procedures to be done inpatient even when they can be safely performed in an ambulatory setting.

Number of Doctors and Nurses

Exhibit 3.2: Impact of alternative assumptions on projected cumulative number of additional private doctors

Additional Number of Doctors	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
"Medium" Penetration Scenario								
0.8 "admissions" per doctor per day	0	149	16	15	15	14	12	527
Sensitivity (Difference from "Medium" Penetration Scenario)								
0.6 "admissions" per doctor per day	0	50	5	6	5	4	5	182
1.0 "admissions" per doctor per day	0	-30	-3	-3	-3	-3	-2	-107

Note: "Admissions" includes most Day Patient cases at HA hospitals and ambulatory procedures covered by hospital inpatient PHI. "Doctors" refers to doctors with admitting rights or are qualified to perform the covered procedure.

Exhibit 3.3: Impact of alternative assumptions on projected cumulative number of additional private nurses

Additional Number of Nurses	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
"Medium" Penetration Scenario								
3.5 nurses per doctor	0	522	56	53	53	49	42	1,851
Sensitivity (Difference from "Medium" Penetration Scenario)								
3.0 nurses per doctor	0	-75	-8	-8	-8	-7	-6	-270
4.0 nurses per doctor	0	74	8	7	7	7	6	257

The Medium penetration scenario assumes 0.8 admissions per doctor per day, based on the experience of two private hospitals.

However, doctors entering the private sector usually require around three years, or more, to build up their client base and achieve this level of productivity, hence in some years, the productivity could be lower.

On the other hand, it may be possible for existing doctors to increase their productivity in the short term to take up the additional patient load. HA operates at roughly one admission per doctor per day, although this is most likely due to scheduling issues; the patient is attended to by the next available doctor rather than a particular doctor chosen by the patient.

Based on conversations with two private hospitals, the nurse to doctor ratio ranges from three to four nurses per doctor.

SECTION 4: SENSITIVITY ANALYSES - GOVERNMENT EXPENDITURE

Introduction

The following sensitivity analyses look at the impact of changing various key assumptions in the projections. We have used the Medium penetration scenario, with a Savings Scheme and savings incentives, as the reference for illustrating the sensitivity of the results to specific assumptions. Our intention is not to illustrate the projected outcomes from all different combinations of possible assumptions but to provide the reader with an understanding of which are the key assumptions and how they impact the results.

High Risk Pool

Exhibit 4.1: Impact of alternative assumptions for high risks on total net change in government financial outflow (HK$ million in 2010 prices)

	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
"Medium" Penetration Scenario, including Savings Incentives								
10%/2%, 6x *	0	313	-96	-148	-149	-174	-309	-3,442
Sensitivity (Difference from "Medium" Penetration Scenario)								
Net Financial Outflow with Savings Incentives, where applicable								
5%/2%, 5x	0	-27	-8	-9	-9	-8	-7	-242
10%/4%, 6x	0	0	35	50	73	111	160	1,798

* "10%/2%, 6x": High Risks are 10% of Year 2012 new lives, and 2% of subsequent new lives, average morbidity of High Risks are 6 times of standard risks

Note: The above sensitivity results exclude the change in HA nominal substitution to isolate only the impact of high risks on HRP funding and savings incentives on the Scheme

The Medium Penetration scenario assumes 10% of new members in 2012 (when the Scheme is launched) and 2% of new members in subsequent years are high risk individuals. High risk individuals are assumed to incur medical costs that are six times higher than a standard risk. These assumptions are towards the high end of our expectations, based on what we have observed in Hong Kong and the USA.

The "5%/2%, 5x" set of assumptions produces lower funding requirements; we consider this set of assumptions to be reasonable.

The "10%/4%, 6x" set of assumptions produces high funding requirements and is probably at the conservative end of a possible range of assumptions.

Overall, the HRP is projected not to be a significant strain on the governments HK$50 billion dollar fund set aside for the Scheme.

Savings Incentives

Exhibit 4.2a: Impact of alternative assumptions on saving incentives and total net changes in government financial outflow (HK$ million in 2010 prices)

	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
"Medium" Penetration Scenario								
Savings Incentives	0	118	334	624	1,005	1,412	1,768	22,264
Net Financial Outflow with Savings Incentives, where applicable	0	313	-96	-148	-149	-174	-309	-3,442
Sensitivity (Difference from "Medium" Penetration Scenario)								
Savings Incentives								
Lower savings incentives	0	-23	-62	-103	-150	-183	-191	-3,101
Private medical inflation -0.8%	0	-1	-13	-46	-110	-202	-310	-2,733
Private medical inflation +0.8%	0	1	13	49	122	234	373	3,145
Scheme impact on private medical costs (cost-savings)	0	-12	-33	-62	-101	-141	-177	-2,226
Scheme impact on private medical costs (abuse)	0	12	33	62	101	141	177	2,226
Net Financial Outflow with Savings Incentives, where applicable								
Lower savings incentives	0	-23	-62	-103	-150	-183	-191	-3,101
Private medical inflation -0.8%	0	-2	-13	-46	-110	-202	-310	-2,735
Private medical inflation +0.8%	0	2	13	49	122	234	373	3,147
Scheme impact on private medical costs (cost-savings)	0	-27	-34	-62	-101	-141	-177	-2,250
Scheme impact on private medical costs (abuse)	0	27	34	62	101	141	177	2,250

- Lower savings incentives. We examine the impact of lower savings incentives, as summarised in Exhibit 4.2b.

Exhibit 4.2b: Savings incentive assumptions

Age Group	Medium Penetration Scenario	Lower Savings Incentives Scenario
65 - 69	40%	30%
70 -74	40%	35%
75 +	40%	40%

- Lower / higher private medical inflation. This looks at the impact of reducing the private medical inflation assumption by 0.8% points (making it equal to assumed public medical inflation) and increasing it by 0.8% points. This reflects the uncertainty of future private medical inflation, which may also be a reflection of the ability of the Scheme to control private medical costs on an ongoing basis, e.g. by increasing the level of competition amongst private providers and insurers.

- Scheme impact on private medical costs. We look at the impact of the premium rates being 10% lower or higher than currently assumed when the Scheme is launched. Premiums could be higher than expected because of a sudden increase in medical charges or moral hazard-induced utilisation (which sometimes happens with high-publicity insurance schemes). Premiums could be lower because of more inpatient procedures being done in an ambulatory setting or strictly enforcement of medical necessity criteria. This also reflects the uncertainty of the premium rate calculation, given the material changes in terms and conditions (e.g. coverage of pre-existing conditions) and benefit structure (i.e. moving from itemised charging to packaged charges).

Overall, the impact of the different assumptions ranges from around -HK$3 billion to +HK$3 billion over 25 years. None of the sensitivities examined gives the difference that can turn the net financial outflow (negative $3,442 million in Medium Penetration scenario) to positive zone, i.e. a deterioration in the budget.

HA Nominal Substitution

Exhibit 4.3: Impact of alternative assumptions on HA nominal substitution and total net changes in government financial outflow (HK$ millions)

	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
"Medium" Penetration Scenario								
Nominal Substitution of Public HE	0	0	-479	-824	-1,213	-1,650	-2,148	-27,352
Net Financial Outflow with Savings Incentives, where applicable	0	313	-96	-148	-149	-174	-309	-3,442
Sensitivity (Difference from "Medium" Penetration Scenario)								
Nominal Substitution of Public HE								
Public medical inflation -0.8%	0	0	18	61	133	238	380	3,329
Public medical inflation +0.8%	0	0	-19	-66	-149	-275	-457	-3,832
Higher shift from public to private	0	0	-71	-98	-130	-166	-208	-2,980
Lower shift from public to private	0	0	70	98	129	166	207	2,970
Net Financial Outflow with Savings Incentives, where applicable								
Public medical inflation -0.8%	0	0	18	61	133	238	380	3,329
Public medical inflation +0.8%	0	0	-19	-66	-149	-275	-457	-3,832
Higher shift from public to private	0	0	-71	-98	-130	-166	-208	-2,980
Lower shift from public to private	0	0	70	98	129	166	207	2,970

- Higher / lower public medical inflation. This directly impacts the value of the projected nominal substitution.

- Higher/lower shift from public to private sector. This looks at the situation where the utilisation of public services by the insured members is higher or lower than we have assumed by 10%. For example, in 2012, the Medium penetration scenario assumes Scheme members use public hospitals 29% of the time. The sensitivity analysis looks at the impact of assuming 26% and 32%, instead of 29%.

Baseline Scenario

Exhibit 4.4: Impact of using different Baseline scenarios on total net government financial outflow (HK$ millions)

	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
"Medium" Penetration Scenario								
Baseline	0	313	-96	-148	-149	-174	-309	-3,442
Sensitivity (Difference from "Medium" Penetration Scenario)								
Net Financial Outflow with Savings Incentives, where applicable								
Lower baseline	0	0	-68	-153	-271	-422	-595	-6,294
Higher baseline	0	0	133	212	271	318	368	5,907

The impact of the Scheme has been measured relative to the Baseline scenario, which largely reflects the PHI penetration rates captured in the 2008 THS. In Exhibit 4.4, we look at the impact of using alternative Baseline scenarios.

- Lower Baseline. The existing penetration rates of old ages are assumed to remain "as-is" in the projection period, as opposed to the original baseline, where the old ages' penetration are projected to be slightly improving. Viewing it from the lapse rate perspective, the average lapse rate for age 65 and above under Lower Baseline scenario is over 25% vs. the 14% assumed under the original baseline scenario. This increase in lapse rates (i.e. drop in penetration rates) could reflect a situation where the economy takes a downturn and/or private medical expenses (and consequently PHI premium rates) become less affordable and more people start to drop their PHI covers.

- Higher Baseline. On the other hand, PHI penetration has been growing over the years (albeit during a period of strong economic growth) and this could continue into the future without any government intervention. To reflect this situation, we look at the impact of assuming a Higher Baseline. In this case, we have assumed the Low penetration scenario as the Higher Baseline. The impact of the Scheme is therefore the difference between the Medium and Low penetration scenarios.

SECTION 5: SENSITIVITY ANALYSES - TOTAL HEALTH EXPENDITURE

Introduction

The following sensitivity analyses look at the impact of changing various key assumptions on the projections on health expenditure. We have used the Medium penetration scenario, with a Savings Scheme and savings incentives, as the reference for illustrating the sensitivity of the results to specific assumptions. Our intention is not to illustrate the projected outcomes from all different combinations of possible assumptions but to provide the reader with an understanding of which are the key assumptions and how they impact the results.

Public Health Expenditure

Exhibit 5.1: Impact of alternative assumptions on public health expenditure (% change from Medium penetration scenario)

	2011	2012	2016	2021	2026	2031	2036
Public Health Expenditure							
Public medical inflation -0.8%	*	*	*	0.1%	0.1%	0.2%	0.2%
Public medical inflation +0.8%	*	*	*	-0.1%	-0.1%	-0.2%	-0.3%
Higher shift from public to private	*	*	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Lower shift from public to private	*	*	0.1%	0.1%	0.1%	0.1%	0.1%
Total Health Expenditure							
Public medical inflation -0.8%	*	*	*	*	0.1%	0.1%	0.1%
Public medical inflation +0.8%	*	*	*	*	-0.1%	-0.1%	-0.1%
Higher shift from public to private	*	*	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Lower shift from public to private	*	*	0.1%	0.1%	0.1%	0.1%	0.1%

Note: * Less than 0.05%.

The outcomes (except difference in expression) and conclusions are the same as in Exhibit 4.3. However, when expressed in terms of public health expenditure and total health expenditure, the impact is relatively small, partly because, in most part, the Scheme only pertains to hospital inpatient care, which makes up around 30% of total health expenditure.

Private Health Expenditure

Exhibit 5.2: Impact of alternative assumptions on private health expenditure (% change from Medium penetration scenario)

	2011	2012	2016	2021	2026	2031	2036
Private Health Expenditure							
Lower savings incentives	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Private medical inflation -0.8%	*	-0.1%	-0.7%	-1.4%	-2.1%	-2.7%	-3.3%
Private medical inflation +0.8%	*	0.1%	0.7%	1.5%	2.3%	3.1%	4.0%
Scheme impact on private medical costs (cost-savings)	-1.7%	-1.8%	-1.9%	-1.9%	-1.9%	-1.9%	-1.8%
Scheme impact on private medical costs (abuse)	1.7%	1.8%	1.9%	1.9%	1.9%	1.9%	1.8%
Total Health Expenditure							
Lower savings incentives	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Private medical inflation -0.8%	*	-0.1%	-0.3%	-0.7%	-1.0%	-1.3%	-1.6%
Private medical inflation +0.8%	*	0.1%	0.4%	0.7%	1.1%	1.5%	1.9%
Scheme impact on private medical costs (cost-savings)	-0.8%	-0.9%	-0.9%	-0.9%	-0.9%	-0.9%	-0.9%
Scheme impact on private medical costs (abuse)	0.8%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%

Note: * Less than 0.05%.

The outcomes (except in expressions) and conclusions are the same as in Exhibit 4.2a. Again, when expressed in terms of private health expenditure and total health expenditure, the impact is relatively small, partly because, in most part, the Scheme only pertains to hospital inpatient care, which makes up around 30% of total health expenditure.

SECTION 6: ECONOMIC AND OTHER IMPLICATIONS

Overview

This section of the report looks at the broader economic and other implications of the Scheme covering:

- Impact on the macro economy
- Impact on individual sectors, i.e. HA, private health care providers, and the insurance industry
- Impact on the Hong Kong population and employers
- Regulatory challenges

Impact on Macro Economy

Soundness of public finance is an important factor underlying economic fundamentals. If the challenge of health care financing cannot be well tackled, there would inevitably be adverse implications for sustainability of the health care system, long-term public finance and macroeconomic stability.

The precise impact on the macroeconomic aggregates such as GDP and private consumption expenditure are difficult to quantify with acceptable level of precision. The major constraint rests with uncertainty in predicting the changes in dynamic consumption and savings behaviours of people affected by the Scheme. For instance, the expenses on premium would mean that people newly insured under the scheme would need to consume less on other goods and services if they want to maintain the same level of savings propensity. But perhaps only some would do so while others would see the insurance protection as substitute of savings. Even then, the reallocation of savings to the Scheme would also have some implications on the economy.

Private Health Care Industry

In terms of the private health care industry in particular, the HPS would provide direct stimulus to demand in the insurance and health care sectors. Under the different penetration scenarios, the Scheme could generate additional value-added and job opportunities, illustrated in Exhibits 6.2 and 6.3, respectively.

Exhibit 6.2: Projected valued-added generated by the Scheme to the private health care industry (HK$ million in 2010 prices)

	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
Low	0	257	372	505	642	792	959	14,883
Medium	0	514	806	1,228	1,726	2,318	2,996	40,113
High	0	1,029	1,707	2,923	4,555	6,704	9,325	108,325

Exhibit 6.3: Projected additional private health care job opportunities generated by the Scheme

	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
Low	0	482	580	646	698	729	742	16,467
Medium	0	964	1,257	1,571	1,875	2,134	2,318	43,010
High	0	1,928	2,662	3,740	4,946	6,172	7,214	112,713

The methodology and assumptions are discussed in Appendix C.

Business opportunities apart, the Scheme can be expected to foster market development in the private health care sector. The Scheme features that promote medical charges transparency, packaged charging, pricing/service benchmarking and quality assurance would potentially be effective means to induce greater transparency and competition in this sector. Market efficiency and consumer confidence could be enhanced as a result.

Private Insurance Industry

Similarly, the Scheme would raise the profile of PHI in the eyes of the public and could expand the size of the PHI market materially, depending on the level of

government incentives. It would generate additional value-added and job opportunities in the insurance industry, as illustrated in Exhibits 6.4 and 6.5, respectively.

Exhibit 6.4: Projected valued-added generated by the Scheme to the private insurance industry (HK$ million in 2010 prices)

	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
Low	0	41	55	75	95	116	139	2,197
Medium	0	81	125	193	273	367	472	6,324
High	0	162	270	464	725	1,067	1,481	17,215

Exhibit 6.5: Projected additional private insurance industry job opportunities generated by the Scheme

	2011	2012	2016	2021	2026	2031	2036	Cumulative 2012-2036
Low	0	69	78	87	93	96	97	2,205
Medium	0	137	177	224	268	305	330	6,122
High	0	275	381	537	712	888	1,035	16,186

As in the case of private health care market, the Scheme by virtue of its design can be expected to promote service standards and increase market transparency in the insurance market. To address the concern that the standardised plans under the Scheme may impede product competition, the Scheme would allow participating insurers to freely offer top-up components over the standardised plans in order to maintain the drive for product competition. Besides, the participating insurers would be free to decide on the premium levels so that price competition would remain.

HA and The Hong Kong Population

The Scheme is expected to provide some relief to HA in terms of shifting admissions to the private sector, particularly if the Scheme is successful in keeping PHI policyholder insured into the older ages. This would mean HA would not be as large an entity with the Scheme as without the Scheme. It would create more balance between the public and private sector. However, overall, HA would still remain the dominant provider of hospital services to the Hong Kong population.

The Scheme provides the choice of private care to those that can afford to pay the required premium. This would be mostly the middle to upper income groups, but because the Scheme includes an entry level Base product, it could also be relevant to individuals with monthly incomes of as low as HK$10,000.

The Scheme provides incentives to members, the most significant, by far, being potential savings incentives. Some may argue that this mostly benefits the middle to upper income population. However, the savings incentives are targeted at the elderly where the penetration is currently only 5% for those aged 65 and above, which implies most of the elderly are relying on HA. Under the High penetration scenario, the penetration rate could eventually increase to 23% in year 2036. We expect the additional 18% would be mostly using the private sector and in self-financing a significant portion of the premium, this segment of the population would actually help reduce public expenditure on health care. Although in most scenarios, the amount of relief is not significant, in some scenarios, the savings to the government could average around HK$1 billion a year over the 25 year projection period.

These savings could be directed to strengthening the service standards for the remaining HA users, or at the very least, it would make it financially slightly less difficult for the government to maintain existing service standards as the population ages.

However, apart from more obvious direct financial and economic implications, there are broader implications and potential benefits of the Scheme, as discussed below.

Employers and Broader Implications

When interviewing employers as part of the "Local Market Situation and Overseas Experience of Private Health Insurance and Analyses of Stakeholders' Views", one clear message from employers was the hope that the Scheme would be able to contain the rising cost of private medical care and PHI. If the Scheme is popular and does manage to attract a substantial number of members, there is a risk that if the Scheme does not have effective control over excessive utilisation and cost of private medical care (i.e. moral hazard), then the Scheme would be tantamount to a mechanism for enriching private medical providers and private insurance companies. For example, in recent years, there has been an increase in the number of investigative tests such as endoscopies and gastroscopies, much of which is considered by some doctors to be excessive and a result of moral hazard. If the PHI market and the Scheme grow

significantly without appropriate controls, then a portion of the new public and private money directed towards the Scheme and the private health care system could be financing doctors who choose to abuse the system. The Scheme would in fact be destroying value.

In principle, the design of the Scheme has the necessary control knobs in place to control excessive utilisation and medical inflation. These include:

- Encouragement of packaged charging to make it easier for patients to compare prices between private hospitals.

- Member cost sharing (e.g. coinsurance, deductibles, and benefit limits) are included in the Scheme product design, in order to keep the Scheme member financially engaged in the decision as to whether a particular procedure or test offers value for money.

- Clinical audits and benchmarking against evidence-based best practice clinical protocols and benchmarking of key performance indicators amongst private hospitals and HA.

- An arbitration panel to address complains from Scheme members, insurers, and health care providers, particularly on issues such as interpreting medical necessity and whether a particular procedure should be covered.

In practice, the ability to implement these controls effectively will depend on the political strength of the Scheme and the supply of private services relative to demand. At the moment, our understanding is the demand for private medical services exceeds supply from private health care providers. The competitiveness of the private hospitals is questionable and existing private hospitals may not accept the control knobs mentioned in a meaningful manner. The government plans to license four new private hospitals with the condition that they operate in accordance with some of the Scheme initiatives (e.g. offering packaged charges) should help, but whether it solves the problem remains to be seen. Health care and management of health care costs is something that is extremely dynamic; there are no pre-set solutions. Instead, what is required is constant monitoring and flexibility to adapt existing control knobs and implement new ones as necessary.

Related to this is the competitiveness of the PHI industry. There is fear of collusion and lack of competition amongst insurers, which would result in a portion of the new public and private money financing going to excessive profits of insurance

companies. Our understanding is that the current PHI market is extremely competitive and profit margins are generally thin and in some cases non-existent. The Scheme design includes measures to facilitate more competition, not less. These initiatives include transparency of reporting of premiums and costs, justification of premium rate increases, and the availability of the standardised Base product that may serve as a price benchmark against top up products and against the Base product of other companies.

Provided there is sufficient competition amongst private health care providers and private insurers, the Scheme has the potential to create a more balanced public-private health care system. It has the potential to create a platform where there are sufficient control knobs to foster sustained and effective growth of the private health care and PHI industry. If Hong Kong has a private market that has the confidence of the government and the public, then the broader economic benefits are numerous:

- The government should have more options as to how it can structure the delivery of care to the lower income populations, i.e. options that include the private sector.

- A private sector that offers quality care at an acceptable price could play a role in helping Hong Kong maintain its competitiveness as a destination setting up high value-added businesses.

- A more dynamic and vibrant private medical industry could lead to further product and process innovations, making Hong Kong a regional "centre of excellence."

The Scheme, being an incentivised Scheme with underlying policy objectives, presents regulatory challenges to ensure that the desired objectives can be met without jeopardising business environment and consumer interests. We have illustrated the challenges and proposed a supervisory structure in the Feasibility Study report (Chapter 5).

APPENDIX A: METHODOLOGY

This section of the report outlines the projection methodology in the following parts:

- Population projections
- Projection of public and private hospital admissions
- Impact of the Scheme
    - Additional private medical resources required
    - Hospital Authority ("HA") nominal substitution
    - Additional government expenditure related to the Scheme
    - Change in the projected public and private health expenditure

Population Projections

For the projection period 2011 – 2036, we have projected the number of members by each population group (i.e. the Scheme insureds, the non-Scheme insureds and the uninsureds) using the following formula:

$$\text{Number of members}_{\text{Year x, Age y, Gender}} = \text{Penetration rate}_{\text{Year x, Age y, Gender}} \times \text{Total population}_{\text{Year x, Age y, Gender}}$$

We have used the existing penetration rates (i.e. as per the 2008 Thematic Household Survey ("THS")) as the initial penetration rates (starting in year 2011), and projected the penetration rates in each projection year by:

For Year 2012:

$$\text{Penetration rate}_{\text{Year } 2012,\ \text{Age } y+1,\ \text{Gender}} = \text{Penetration rate}_{\text{Year } 2011,\ \text{Age } y+1,\ \text{Gender}} + \left(\text{New Lives}_{\text{Year } 2012,\ \text{Age } y+1,\ \text{Gender}} / \text{Population}_{\text{Year } 2012,\ \text{Age } y+1,\ \text{Gender}}\right)$$

For subsequent years after 2012:

$$\text{Penetration rate}_{\text{Year } x+1,\ \text{Age } y+1,\ \text{Gender}} = \text{Max}\left\{\text{Penetration rate}_{\text{Year } x,\ \text{Age } y+1,\ \text{Gender}}, \text{Penetration rate}_{\text{Year } x,\ \text{Age } y,\ \text{Gender}} \times \left(1 - \text{Lapse rate}_{\text{Age } y,\ \text{Gender}}\right)\right.$$

using the following assumptions:

	Penetration Scenario			
	Baseline	**Low**	**Med**	**High**
Source of Scheme members at outset				
Existing Individuals	-	500,000	1,000,000	1,500,000
Group underinsured*	-	25%	50%	50%
Previously uninsured individuals ("New Lives")	-	100,000	200,000	400,000
Lapse rates				
Scheme	High	High	Med	Low
Non-Scheme	High	High	High	High

Notes:

"High" lapse rate = lapse experience consistent with yearly-renewable-term insurance in the U.S.

"Low" lapse rate = lapse experience consistent with whole-of-life insurance in the U.S.

"Med" lapse rate = average of "High" and "Low" lapse rate

(*) 25% and 50% pertain to around 32,500 people and 65,000 people respectively.

In the projection, we further split the Scheme and non-Scheme insureds into the following types of insurance covers:

- Individual insurance cover only
- Group insurance cover only
- Individual and group insurance covers

High Risk Pool ("HRP")

In addition, the Scheme also includes a HRP to serve those who would have been quoted very high premiums due to serious health conditions (the "High Risks"). The HRP is assumed to be 10% of new lives joining the Scheme in 2012, and 2% of the new lives in the subsequent years.

Projection of Hospital Admissions

The public and private hospital admissions are calculated based on the assumed utilisation rates, which are largely based on:

- 2009 actual HA and private hospital admissions, adjusted for the Scheme benefit coverage

- Milliman Health Cost Guidelines in Hong Kong, United States, and United Kingdom

and vary by age, gender, insurance status and the type of insurance coverage.

The average utilisation of the High Risks in HRP is assumed to be 6 times of the average Scheme insureds.

Impact of the Scheme

Based on the various penetration and public-private hospital admissions in the projection period in each scenario, we have examined the impact of the Scheme in the following areas:

- Additional private medical resources required
- HA nominal substitution
- Additional government expenditure related to the Scheme
    - Premium discounts of new joiners
    - HRP funding
    - Scheme supervision
    - Premium rebates to age 65 and above
- Change in the projected public and private health expenditure

Throughout the projection in this study, all public and private medical costs are inflated by the assumed public and private medical inflation rates provided by the Food and Health Bureau ("FHB"), which are on average around 3.0% and 3.8% in our projection period of 2011 to 2036, before consideration of volume growth.

Additional Private Medical Resources Required

We have estimated the additional number of private doctors, nurses and beds based on

- Number of additional private hospital inpatient ("IP") and ambulatory procedure ("AP") admissions under each scenario (relative to Baseline scenario), and

- Average productivity of doctors and nurses in the current private hospitals
- Average length of stay of private IP admission
- Estimated average occupancy rate of private hospitals

HA nominal substitution

With the Scheme, the future HA admissions are projected to be increasing more slowly than the Baseline scenario (i.e. without the Scheme). As a result, we would also expect a smaller increase of the future public health expenditure, which is derived by:

- Average length of stay of public IP admission
- Estimated cost per day/admission per each IP/AP

The above estimation approach is consistent with the current methodology adopted by HA.

Additional government expenditure related to the Scheme - Premium discount of new joiners

To derive the costs of the premium discount of new joiners, we have looked at the difference between:

- Average no-claim discount ("NCD") ratios of an actual mature Private Health Insurance ("PHI") portfolio using the NCD structure of the Scheme (i.e. the average NCD the insurers are expected to offer for the Scheme plans after three years)

- 30% flat premium discounts offered to all new joiners of the Scheme in the first three years provided they remain claim-free

The difference between the above two ratios are the additional "costs" of providing the flat premium discounts in the first three years of the Scheme, which is subsidised by the government. The total additional "costs" are then derived by applying the difference to the total premiums of the new joiners of the Scheme (calculated based on the age-gender standard premium rates from "Feasibility Study on the Key Features of the Health Protection Scheme" and the projected population demographics of the Scheme).

Additional government expenditure related to the Scheme – HRP funding

The premium rate of each insured in the Scheme is capped at three times the corresponding standard premium rate. For the HRP, the rest of the costs would be supported by the HRP reinsurance premiums paid by the insurers into the HRP and the subsidy from the government when necessary – in order to maintain the viability of the HRP and the Scheme, we have assumed that the maximum HRP reinsurance premiums paid by the insurers will be 2% of the corresponding Scheme premiums and any additional costs required to support the HRP will be provided by the government.

Additional government expenditure related to the Scheme – Scheme supervision

The basic regulatory cost for the Scheme in 2012 is assumed to be HK$ 35 million. For Medium and High scenarios (where we have assumed a savings component in the Scheme), there is an additional HK$ 10 million of regulatory costs.

A 2% real inflation rate (i.e. excess over general inflation) was assumed when projecting the future regulatory costs, in view of the high value-added expertise required.

Additional government expenditure related to the Scheme – Costs of savings incentives

This is applicable to the Medium and High scenarios (those scenarios with a savings component in the Scheme). The savings incentives would take the form of premium rebates for age 65 and above in the Scheme individual plans, and the corresponding rebate percentages are:

Scenario	Med	High
Rebate %	40%	60%

Change in the Projected Public and Private Health Expenditure by provider

We have also estimated the relative change of the projected public and private health expenditure by the following factors.

- Expenditure on health care services in the public sector:
    - HA nominal substitution
- Expenditure on health services in the private sector , mainly because more people purchase PHI and the shift from public to private medical providers:
    - Additional PHI premiums, which are calculated using the age-gender standard premium rates after applicable NCD and the increase in PHI insureds in each scenario (relative to Baseline)
    - Additional private medical co-payments associated with the increasing private utilisation (driven by the higher PHI penetration), based on the average co-payment percentages of the current PHI products, adjusted for the Scheme benefit design

APPENDIX B: ASSUMPTIONS

Exhibit B1: Source and basis of assumptions

Assumptions	Source / Basis

Initial penetration rates in 2011 by
• Age-gender
• Insurance status
• Type of insurance coverage
  ○ Group only
  ○ Individual only
  ○ Group and individual
	2008 Thematic Household Survey ("THS")

Projected population in 2011 – 2036	2006-based population projection compiled by the Census and Statistics Department
Lapse rates • High • Med • Low	Individual life insurance lapse experience in the United States conducted jointly by LIMRA International and the Society of Actuaries (2007)
High Risk Pool assumptions • Relative size • Mortality rates	• United States experience • Hong Kong insured non-smoker mortality tables (97)
Public/Hospital Authority ("HA") hospital utilisation	Detailed 2009 utilisation and cost data from HA
Private hospital utilisation	• Private hospital admissions data from the Department of Health • Milliman Health Cost Guidelines in Hong Kong, United States, and United Kingdom
Scheme individual premium rates	Results from "Feasibility Study on the Key Features of the Health Protection Scheme"
Public and private medical inflation rates	Working assumptions provided by the Food and Health Bureau
Cost of HA hospitalisation used in calculating HA nominal substitution • Inpatient (per day) • Ambulatory Procedure (per case)	HA

Exhibit B2: Hospital admission rate and utilisation by age group and insurance status

Age Group	Insured			Uninsured			Overall		
	Overall Admission Rate	Public Share	Private Share	Overall Admission Rate	Public Share	Private Share	Overall Admission Rate	Public Share	Private Share
0-64	12%	37%	63%	15%	87%	13%	14%	70%	30%
65+	33%	38%	62%	57%	93%	7%	56%	92%	8%
Total	13%	37%	63%	23%	90%	10%	19%	78%	22%

Source: Estimates based on the Milliman Hong Kong Health Cost Guidelines, 2008 THS, and the number of private and HA admissions.

APPENDIX C: ECONOMIC IMPACT ESTIMATION

We based on the following methodology to estimate the value-added and the additional job opportunities of the private health care sector and private health insurance sector generated by the Scheme:

- Gross output of the private health care and insurance sectors
    - For private health care sector, the gross output in any projection year is equivalent to the projected expenditure on private health care which is tantamount to business revenue from the industry angle. It is also equivalent to the payment from Private Health Insurance ("PHI") claims and out-of-pocket payments on private health care.
    - For private insurance sector, the gross output in any projection year is equivalent to the projected gross margin (i.e. premium minus claims) of PHI.
- Value-added and jobs created
    - Value-added here refers to direct value-added generated from production of services in the PHI and health care sector. We adopt conventional definitions of value-added that refer to the sum of business profits and labour income, after deducting intermediate consumption from gross output.
    - Job creation is directly driven by value-added rather than gross output. Statistics showing the relativity across gross output, value-added and number of employed persons engaged at the industry level provide reference for estimating the value-added and job creation on the basis of our projected impacts on private health expenditure and PHI premium due to the Health Protection Scheme ("HPS").
- Calculation of additional value-added and additional job opportunities of each industry
    - We estimated the additional value-added and additional job opportunities using the following formulae:

Additional Value-added $_{year\ x}$ *= assumed value-added to gross output ratio * gross output* $_{year\ x}$

Additional job opportunities $_{year\ x}$ *= Additional value-added e* $_{year\ x}$ **-value-added per person engaged* $_{year\ x}$

Value-add per person engaged $_{year\ x}$ *= Value-added per person engaged* $_{2008}$ * $\prod(1 + growth_{year})$

- The assumptions are made after making reference to our market experience and relevant indicators provided by the Census and Statistics Department and working assumptions on economic indicators provided by the Food and Health Bureau ("FHB"):

	Value-added to gross output ratio	Value-added per person engaged	
		As of 2008 (HK$ m, 2010 dollars)	Growth p.a.
Private Health Care	0.71	0.47	Based on working assumptions on medical inflation provided by FHB, ranging from around 3% to 5% in the years between 2011 and 2036
Private Health Insurance	0.52	0.52	

- It should be noted that using the above approach, it is assumed that the extra private health service demand can be fully met by market capacity.