TEAM ZEN

BELLAGOS:

EVALUATION OF THE COUNTRY'S SOCIAL LONG TERM INSURANCE PROGRAM

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EXECUTIVE SUMMARY

This report evaluated Bellagos' Social Long-Term Care (LTC) insurance program based upon data and information provided by the case study. By analyzing the country's current situation and comparing it to a few peer countries, specifically Japan and the United States, strategic recommendations were given to ensure Bellagos sustainably meets future needs for LTC in the next decade.

Our initial analysis showed the current program underserves its citizens for the purpose of providing sustainable funding, with a deficit appearing within two years. We analyzed the most important factors as below:

- Aging population with people living longer but requiring better care
- Decreasing fertility rate and fewer professionally trained caregivers created burdens both financially and physically to the system
- Sole reliance on tax revenue, inefficient use of investment and private sector

We proposed a suite of suggestions to improve the status quo:

In the short-term, we recommend increasing tax contribution by 0.5% for "young" citizens with a higher income bracket. We also recommend introducing a tiered co-pay system in facility care to incentivize citizens to choose home care regime instead of facility care, and grant higher benefits to the ones in need.

In the long-run, we recommend to better utilize investment assets from the LTC program, investing in impactful healthcare R&D to seek groundbreaking development in the field. We also argue it's beneficial to facilitate the role of the private sector, both in terms of private LTC insurance offerings as well as promoting community-based care facilities, to stimulate the industry as well as relieve burdens from the government.

I. STRATEGIC RECOMMENDATIONS

Based on our analysis, we recommend improving the current system by executing the following strategies:

1. Efficiently allocate benefit costs by encouraging people to use home care benefits instead of facility care by introducing a copay structure for facility care benefits.
2. Effectively utilizing funding for citizens in need by introducing tiered copay where higher income citizens have a higher copay percentage compared to lower income citizens.
3. Additional funding infusion by increasing the contribution ratio by 0.5% for citizens aged 65 and under with household income great than 75,000, equally split between insured and employers to ease the additional burden to citizens.
4. Pursue long-term sustainable and impactful investment strategy to preserve reserve asset value, earn favorable return, and fund development in advancing healthcare R&D.
5. Engage private sectors in the LTC space. This includes motivating insurance providers to offer LTC coverage assisting the social LTC plan by incentivizing citizens to save for their future health care. Incentivize community-based or privately run caregiving facilities, which not only improves employment, but also provide LTC services at a more efficient manner.

Among the recommended strategies, the first three will generate immediate relief to the current system by cutting down expense and infusing additional funding. The later two strategies focus on long-term development and sustainability of the program to ensure Bellagos' LTC system is robust and improves the well being of citizens from both financial and experiential perspective.

To reflect our recommendations, we projected the best effort results:

- ✓ Increase tax rate by 50 bps for citizens under, not including, 65 year old with income > 75,000.
- ✓ Introduce a tiered copay system for facility care: income <= 75,000, copay 10%, income > 75,000 but <= 100,000, copay 20%, income > 100,000, copay 30%; consequently, shift % taking facility care to home care by 1/3.
- ✓ Reducing care transition probability to worse care level by 1/4.
- ✓ Increase investment return to 5% on the accumulated surplus

While all recommendations are important, we believe the most significant improvement comes from improving care transition probability. This assumption revision is meant to reflect an improvement of citizens' morbidity level. With better healthcare and treatment, we argue citizens' health will be less likely to continue worsening, and they are more likely to remain in their current care level. This echoes our recommendation to invest in healthcare R&D and incentivize private sector to improve the quality of living for Bellagos citizens. Ultimately, this improvement will transfer to lower cost to the LTC system.

The best effort outcome is shown below:

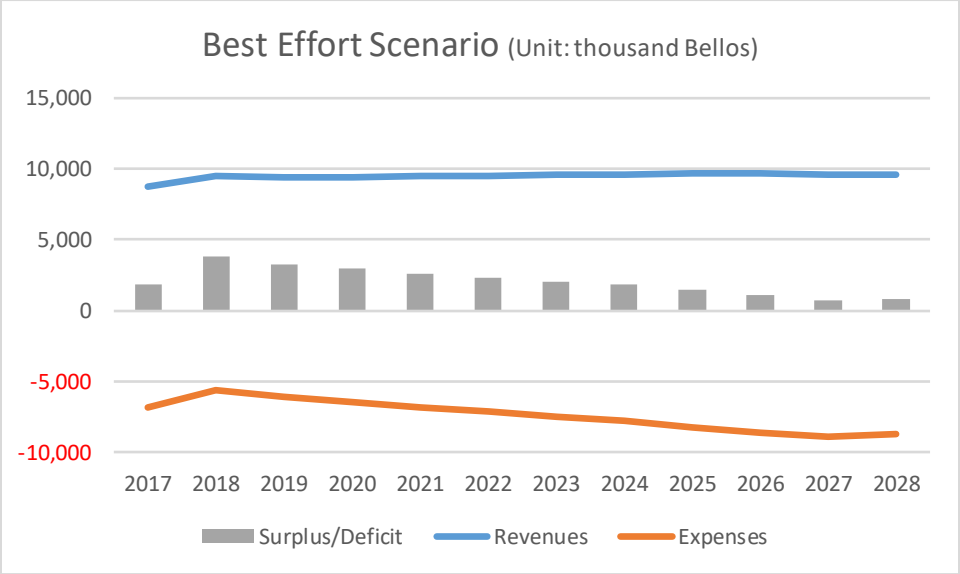

Figure 1 – Best Effort Scenario

Thousand Bellos

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Revenues	8,720	9,481	9,416	9,434	9,485	9,525	9,571	9,633	9,673	9,685	9,652	9,579
Expenses	-6,893	-5,681	-6,144	-6,473	-6,876	-7,173	-7,514	-7,814	-8,244	-8,610	-8,917	-8,728
Surplus/Deficit	1,828	3,800	3,271	2,960	2,609	2,352	2,057	1,819	1,429	1,075	735	851
Accumulated Surplus/Deficit	1,828	7,286	10,558	13,518	16,127	18,479	20,536	22,355	23,784	24,859	25,594	26,444
Surplus/Deficit ratio	27%	67%	53%	46%	38%	33%	27%	23%	17%	12%	8%	10%
Equality ratio	1.4	2.4	3.0	3.3	3.4	3.4	3.3	3.2	3.0	2.9	2.7	2.7

Table 1 – Best Effort Scenario

II. MODELING METHODOLOGIES

Our analysis focused on projecting the future expenses of the LTC program in comparison to the future revenue income. The surplus or deficit generated illustrates whether the current program is funded sufficiently for the next 10 years and is sustainable for the future.

Data

We largely relied on data provided by the case study to conduct the analysis.

- Population: sample data on 10,000 Bellagos household, proportionally representative of the full population
- Mortality Assumption: estimated mortality rates for 2005, 2010, and 2015
- Care Level Transition Probability: care level transition matrix calibrated by the government
- Macro and Program-specific Trend: annual historical data from 2013 to 2017 in various categories

Modeling

We generated the future expenses and revenue income based on the following steps.

Step 1: Simulate individual's health status

We generated a uniformly distributed random variable and compared it to the mortality rate to determine whether the individual is alive or dead. If alive and aged over 65, another uniform random variable is generated, and is used to determine the health status (healthy/ level1/2/3/4) for the individual.

Step 2: Calculate the future revenue income

For healthy individuals from Step 1, we calculated tax payment by multiplying projected annual earnings, adjusted by wage growth rate, with tax rates. Different tax rates are used depending on whether the individual is "childless" or not.

Step 3: Calculate the future expenses

For individuals simulated needing LTC (care level 1/2/3/4), insurance expense is calculated. Expense payments are weighted average of home care and facility care using weights implied by historical data. Future payments are increased overtime reflecting past trend and capped at the program specified maximum payout level.

Step 4: Assess evaluation indicators

Sustainability:

- The gap between revenues and expenses and the ratio of surplus/deficit to expenses.
- Accumulated surplus/deficit.

Equality:

- The ratio of "per capita burden on people aged 18-64" to "per capita burden on people aged 65+". Therefore, if the burden is equally distributed, the ratio becomes 1.

Step 1-4 is repeated for each person (member 1-6 in every household) and for every projection year (until 2028). Since we introduced random variables in modeling, we repeated the calculation multiple times to ensure our results converge.

<u>Assumptions</u>

- ➢ Mortality: mortality rates for people aged over 65 are assumed to improve moderately (factor of 0.01 every year, see *Appendix II* for calibration rational and details) in the next 10 years. Mortality rates for unhealthy people are three times the general population mortality rate.
- ➢ Wage Growth Rate: annual earnings are assumed to increase based on wage growth rate as of 2017, at 1.4%.
- ➢ Starting Wage for New Entrants in Workforce: children turning 18 (household members 3 – 5) are assumed to start working. Their annual earnings are calculated based on the average salary of people aged 18 in 2017 follow the wage growth rate.

- Eligibility for Benefits: individuals whose Annual Employment Credits is less than 2, insurance benefit is not paid even if they become unhealthy. However, we assume they will pay tax so they can start receiving benefits from 2019.
- Investment Return: accumulated surplus is assumed earning 2.5% investment return on an annual basis.

Results

Based on the current program, the gap between revenues and expenses becomes negative in 2019. The equality ratio becomes very high, which means the inequality between people aged 18-64 and 65+ enlarged. This is due to the percentage of the population requiring care-level 1-4 doubled from 4% to 8% over the next 10 years (see *Appendix I*), creating higher demand for benefit payouts and higher expenses to the LTC program. Due to people needing care leaving the workforce as well as the low fertility rate, the number of working population gradually decreases (see *Appendix I*), and the society is aging. This means revenue is also decreasing.

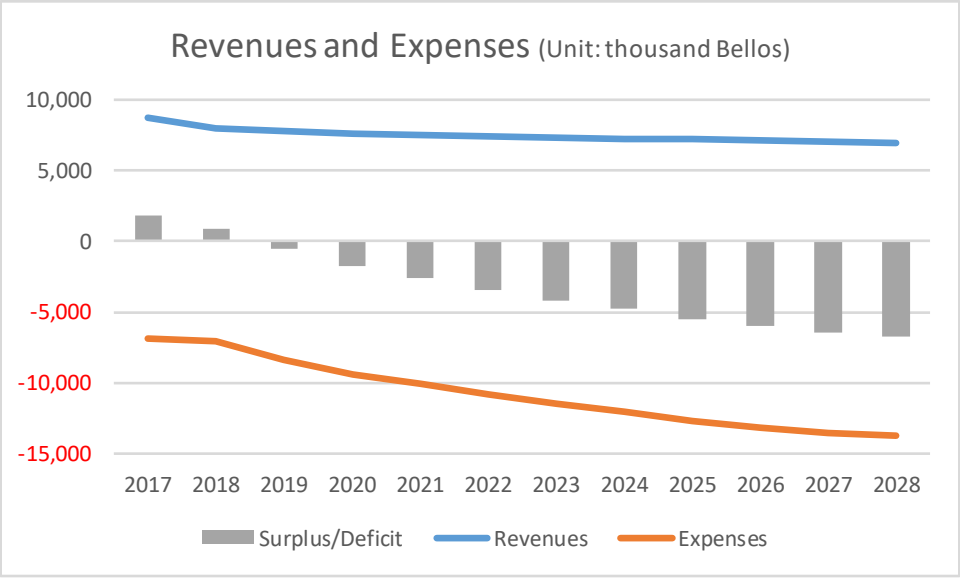

Figure 2 – Baseline Projection

Thousand Bellos

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Revenues	8,720	7,992	7,766	7,621	7,495	7,414	7,344	7,285	7,237	7,188	7,093	6,987
Expenses	-6,893	-7,106	-8,334	-9,410	-10,073	-10,808	-11,489	-12,052	-12,716	-13,136	-13,509	-13,762
Surplus/Deficit	1,828	886	-568	-1,789	-2,577	-3,394	-4,146	-4,766	-5,479	-5,948	-6,415	-6,775
Accumulated Surplus/Deficit	1,828	2,714	2,146	357	-2,221	-5,615	-9,760	-14,527	-20,005	-25,953	-32,368	-39,143
Surplus/Deficit ratio	27%	12%	-7%	-19%	-26%	-31%	-36%	-40%	-43%	-45%	-47%	-49%
Equality ratio	1.4	3.2	5.3	7.4	8.7	9.7	10.5	10.5	9.9	9.4	9.2	9.1

Table 2 – Baseline Projection

III. SUSTAINABILITY ASSESSMENT

Based on our analysis of the current demographics and the revenue and expense trends, Bellagos' LTC program is considered under-funded with an accumulated deficit of nearly 40 million in 2028. We conducted the following sensitivity tests to understand contributions from various inputs. More detailed results can be found in *Appendix II*.

% getting Home Care vs. Facility Care

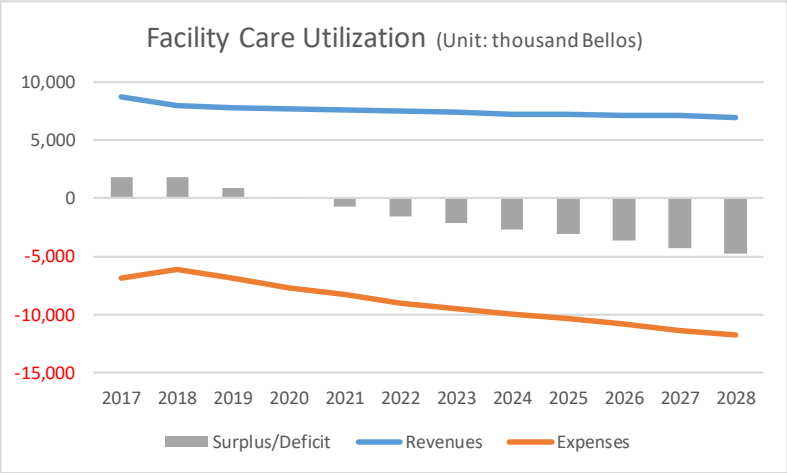

Figure 3 – Decrease % of facility care by ½

Mortality Improvement

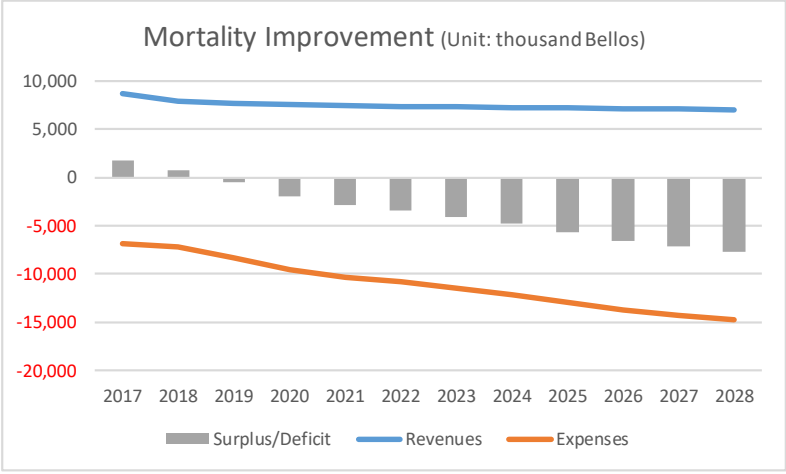

Figure 4 – Increase in mortality improvement factor from 0.01 to 0.02

Morbidity Improvement

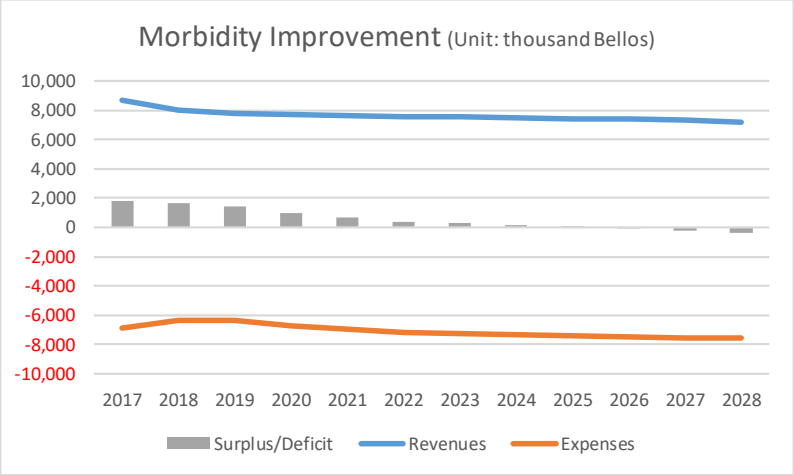

Figure 5 – Reduction in probability of moving to a worse status by ½ (*Appendix IV*)

Wage Growth Rate

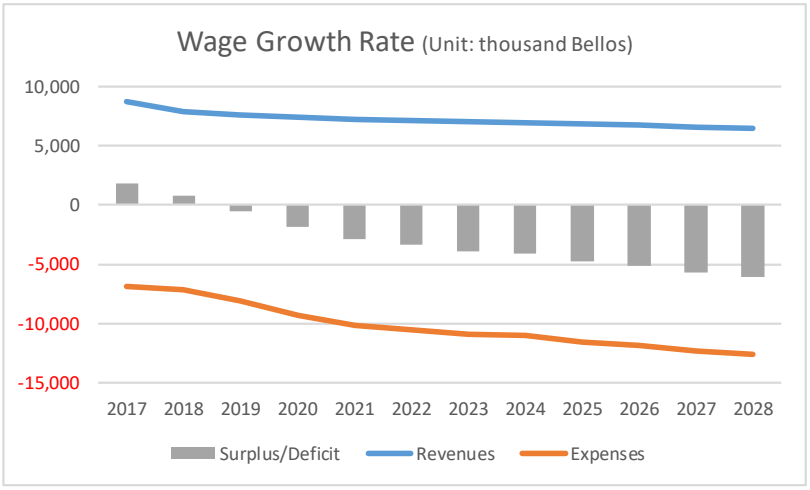

Figure 6 – Reduction in wage growth rate from 1.4% to 0.7%

Based on the analysis, we identified both "decreasing % of facility care by ½" and "reducing probability of moving to a worse status by ½" creates big impact at closing the gap between revenues and expenses. Hence, our strategies focused on how to improve morbidity, reducing the chance of individuals transitioning to worse care level and how to incentivize users to utilize home care regime instead of facility care.

IV. TRADEOFFS and OPPORTUNITIES

The sustainability and quality of LTC services available in Bellagos is crucial to the quality of life for the people who rely on these services. Over the next 10 years, changes must be made to ensure that LTC services continue to be economically viable. The government, private insurance companies, long term care patients and facilities as well as the taxpayers of Bellagos all have a stake in the adjustments made to the current program offerings.

- Long-term care patients – patients seek highest quality service at a low or no cost
- Government – as elected officials, the government must balance the desires of all taxpayers and provide the highest service possible within the confines of the country's budget
- Taxpayers of Bellagos – taxpayers would like to minimize their tax liability while also seeing the greatest return on their investment (i.e. highest quality care available for lowest taxable amount)
- Insurance companies – private insurance companies seek to generate profit through high premium income and low claims volume
- LTC caregivers and facilities – often privately owned and run, if used properly can be economically viable and alleviate social care burden

Therefore, based on the variety of key stakeholders, creative methods must be taken not only to lower costs but also to heighten patient experience.

The threat of growing costs is a problem not only for Bellagos but also for other countries around the world. As Bellagos looks to implement new policies, understanding the actions taken by foreign parties can help to identify best practices. As shown in the chart below, the following countries spend the largest percentages of their gross domestic product (GDP) on LTC services:

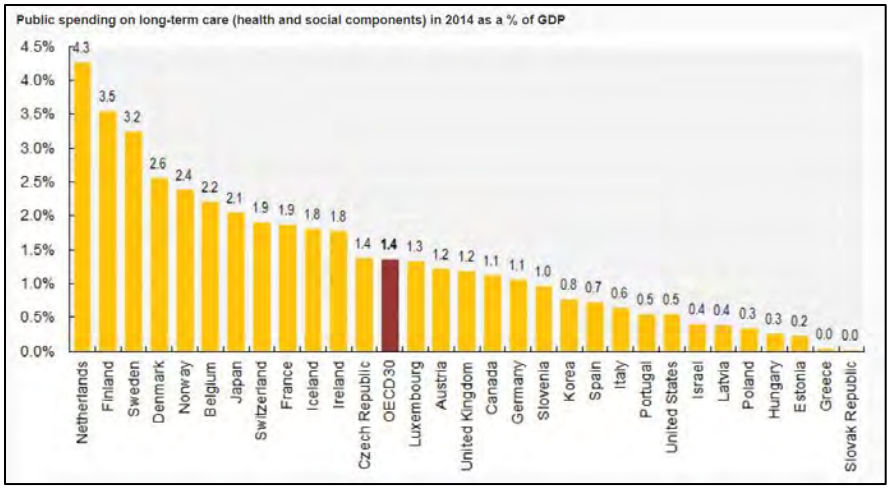

Figure 7 – Percentage of GDP spent on LTC services by country (OECD, 2017)

Japan

Japan is one of the countries currently facing this crisis as an aging population has created significant strain on funding. The population presently follows the age distribution shown below:

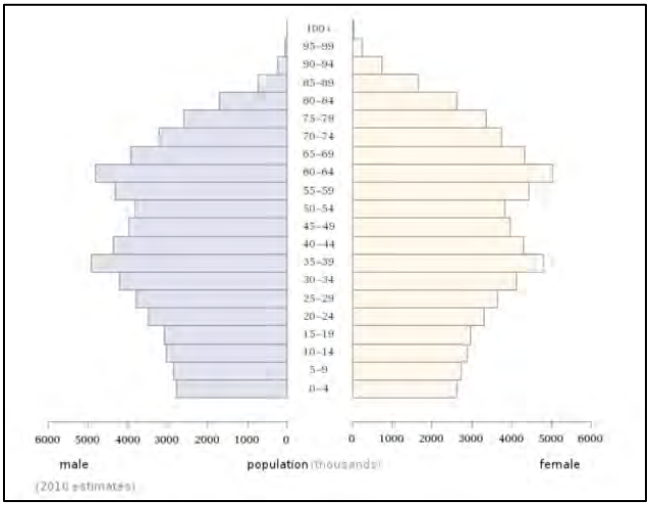

Figure 8 - Japanese Population Distribution (ISSA, 2018)

Therefore, in order to revise the LTC insurance market to meet this demographic shift, the country implemented the following initiatives (MHLW, 2016):

- Community based integrative care as both a preventative measure as well as support and guidance to keep patients out of the hospital
- Reduction in premiums paid by low-income citizens while at the same time an increase in required co-pays for the wealthier segment of the market

Please refer to *Appendix V* for additional information. Bellagos could consider taking a similar approach by utilizing community based care and a scaled co-pay structure to increase the number of citizens with coverage, decreasing the funding deficit.

United States

The United States, on the other hand, has taken steps to increase the prevalence of private insurers in the LTC system. According to Judith Feder, a professor of public policy at the McCourt School of Public Policy at Georgetown University, "seventeen percent of the [US] population is without health insurance … but close to 100 percent is without long-term care insurance." (Eisenberg, 2013) As noted in a study performed by the National Association of Insurance Commissioners, the US LTC insurance business has contracted year over year with companies such as Prudential, Met Life and John Hancock dropping out as business was not profitable. (NAIC, 2016). In response, insurance companies have begun creating "hybrid" life insurance policies, with both life insurance as well as a rider for long term care coverage included within the plan.

Figure 9: The 3 most significant players in the US "hybrid" insurance market (Elliot Raphaelson, 2017)

By packaging the coverage in this way, a greater percentage of citizens are covered for LTC through private insurance, reducing the burden on government funded solutions. This example is just one potential way for Bellagos to increase the involvement of private insurers in the LTC segment.

By understanding the actions taken in other countries, the best opportunities for Bellagos can be identified to meet the needs of each of the key stakeholders and prevent the country's funding crisis.

V. LIMITATIONS

We conducted the analysis around information provided by the case study. There are certain limitations constraining the scope and completeness of the exercise. A few of the major ones are identified below.

Data

- Information on other social welfare systems, such as public health insurance regime and pension system. A country's social LTC benefit does not exist in silos, it is offered to citizens in need as a part of the social welfare system. Hence, it is important to take into account the country's entire welfare system and consider the balance between benefits and income on a holistic basis. For example, if the tax burden of other social programme is high, it can be considered whether there is room for these programs to subsidize LTC.
- Current surplus or deficit balance for the social LTC program. If the LTC system had surplus before 2017, the system would have owned investment assets, which will earn investment returns to offset future deficits.

Assumptions

- Efficiency at collecting tax revenue for supporting the LTC program. In our model, we assumed all people who are earning income pay full tax payments, but realistically there are always loopholes citizens take to skip taxes. How efficient Bellagos government collect tax revenue is important for sustaining its LTC program. In our model, we also assumed that earnings after age 65 halves to account for some people retiring from the system. If we have data on average retirement age and income after retirement, we can better predict tax revenue.
- Increase in LTC expenses due to inflation and higher care cost. The current model only assumed to cap the expenditure at the current maximum payout without increasing level of benefits overtime at all. The facility will become more strained if we were to increase the

maximum payouts anticipating inflation or potential increase of care costs. This is critical to keep in mind, but unlike the private market, these upward benefit adjustments belong to a more deliberate social/political decision, without better information, we assumed no changes.

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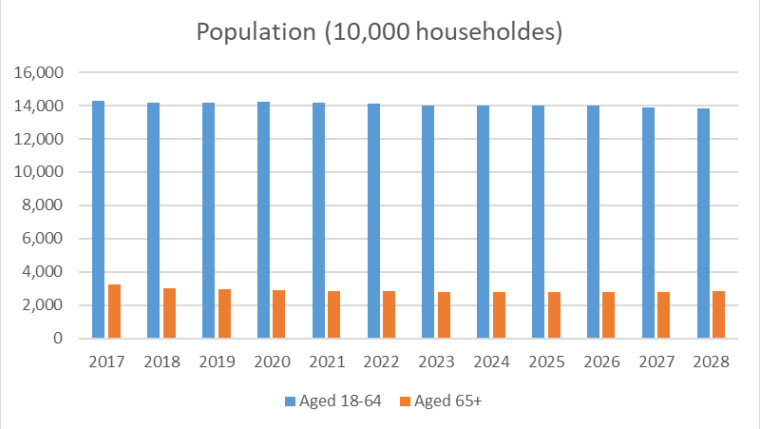
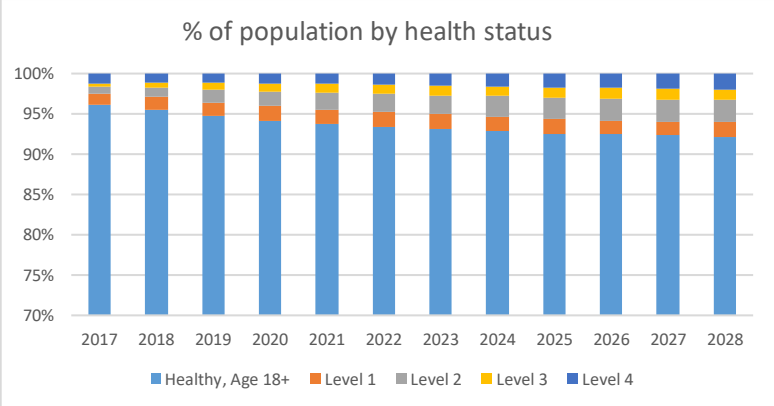
Appendix I: Baseline Results Details

The charts below showed demographics of the modeled population along our baseline scenarios, which provides a good picture how the insured and beneficiaries population evolve over time.





Appendix II: Sensitivity Results

% getting Home Care vs. Facility Care

Thousand Bellos

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Revenues	8,720	7,979	7,777	7,679	7,603	7,503	7,404	7,287	7,239	7,192	7,106	7,003
Expenses	-6,893	-6,118	-6,872	-7,699	-8,302	-9,054	-9,544	-9,988	-10,339	-10,800	-11,358	-11,742
Surplus/Deficit	1,828	1,861	906	-20	-698	-1,551	-2,140	-2,700	-3,100	-3,609	-4,252	-4,739
Accumulated Surplus/Deficit	1,828	3,689	4,594	4,575	3,876	2,326	186	-2,515	-5,615	-9,223	-13,475	-18,214
Surplus/Deficit ratio	27%	30%	13%	0%	-8%	-17%	-22%	-27%	-30%	-33%	-37%	-40%
Equality ratio	1.4	3.2	5.4	7.4	8.5	9.4	10.5	10.5	9.9	9.5	9.3	9.2

Mortality Improvement

Thousand Bellos

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Revenues	8,720	7,978	7,749	7,608	7,479	7,395	7,337	7,288	7,243	7,183	7,101	7,000
Expenses	-6,893	-7,245	-8,277	-9,559	-10,370	-10,758	-11,436	-12,116	-12,944	-13,783	-14,284	-14,722
Surplus/Deficit	1,828	732	-528	-1,952	-2,892	-3,363	-4,099	-4,829	-5,701	-6,600	-7,184	-7,721
Accumulated Surplus/Deficit	1,828	2,560	2,032	80	-2,811	-6,174	-10,273	-15,102	-20,802	-27,403	-34,587	-42,308
Surplus/Deficit ratio	27%	10%	-6%	-20%	-28%	-31%	-36%	-40%	-44%	-48%	-50%	-52%
Equality ratio	1.4	3.2	5.4	7.5	9.0	10.0	10.6	10.7	10.0	9.8	9.2	9.2

Morbidity Improvement

Thousand Bellos

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Revenues	8,720	8,003	7,795	7,715	7,658	7,601	7,543	7,490	7,448	7,398	7,307	7,195
Expenses	-6,893	-6,373	-6,373	-6,706	-6,982	-7,204	-7,276	-7,308	-7,379	-7,509	-7,559	-7,587
Surplus/Deficit	1,828	1,630	1,422	1,009	676	396	268	183	69	-111	-252	-392
Accumulated Surplus/Deficit	1,828	3,457	4,879	5,888	6,564	6,960	7,228	7,410	7,480	7,368	7,116	6,724
Surplus/Deficit ratio	27%	26%	22%	15%	10%	5%	4%	3%	1%	-1%	-3%	-5%
Equality ratio	1.4	3.0	4.9	6.6	8.0	8.8	9.9	9.7	9.1	9.0	8.6	8.4

Low Wage Growth Rate

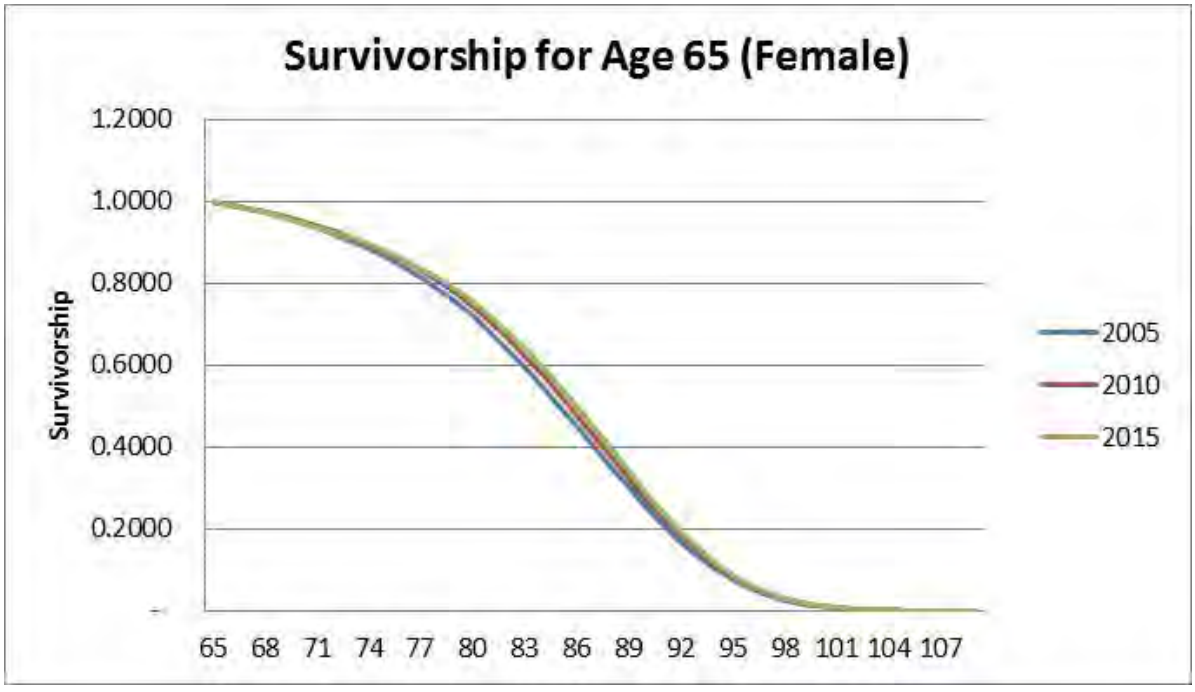
Thousand Bellos

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Revenues	8,720	7,918	7,646	7,462	7,285	7,155	7,029	6,929	6,840	6,748	6,620	6,482
Expenses	-6,893	-7,149	-8,125	-9,293	-10,154	-10,537	-10,944	-11,036	-11,590	-11,841	-12,285	-12,584
Surplus/Deficit	1,828	770	-478	-1,831	-2,869	-3,382	-3,915	-4,107	-4,750	-5,093	-5,665	-6,102
Accumulated Surplus/Deficit	1,828	2,597	2,119	288	-2,582	-5,963	-9,879	-13,986	-18,736	-23,828	-29,494	-35,595
Surplus/Deficit ratio	27%	11%	-6%	-20%	-28%	-32%	-36%	-37%	-41%	-43%	-46%	-48%
Equality ratio	1.4	3.2	5.3	7.3	8.7	9.3	10.3	10.6	10.0	9.6	9.0	8.7

Appendix III: Mortality Improvement Calibration

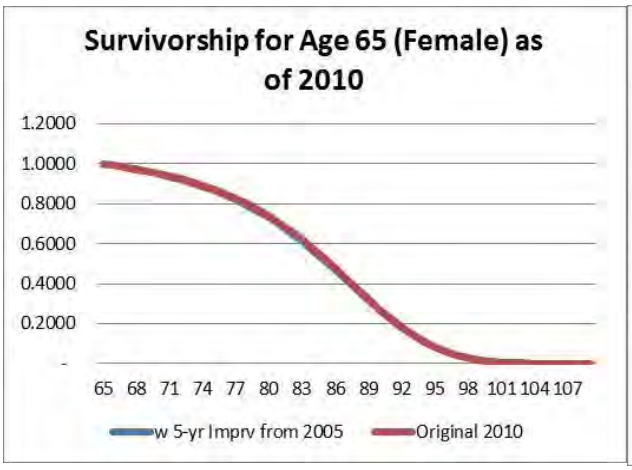
Based on the three mortality tables provided, we noticed improvement of mortality in the country overtime. The graph below showed an illustrative survivorship for a 65-year old female using the table provided for year 2005, 2010, and 2015.

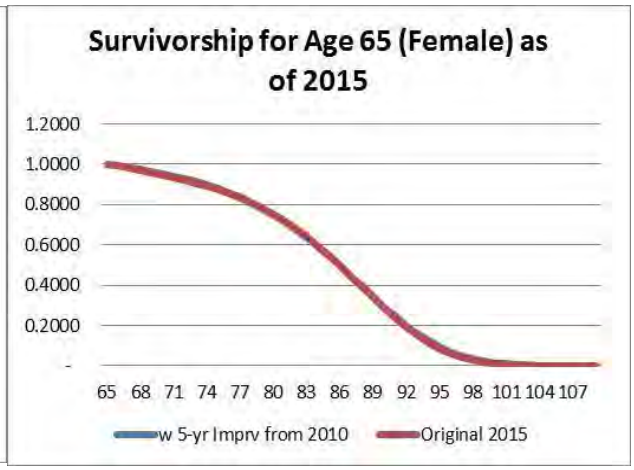
Since survivorship is a critical element at determining the size of population utilizing LTC benefit, we decided it's important to capture the trend and continue assuming the improvement for the next 10 years of projection. We kept mortality the same for age 65 and under, since citizens would be in contribution phase, higher mortality is more conservative.

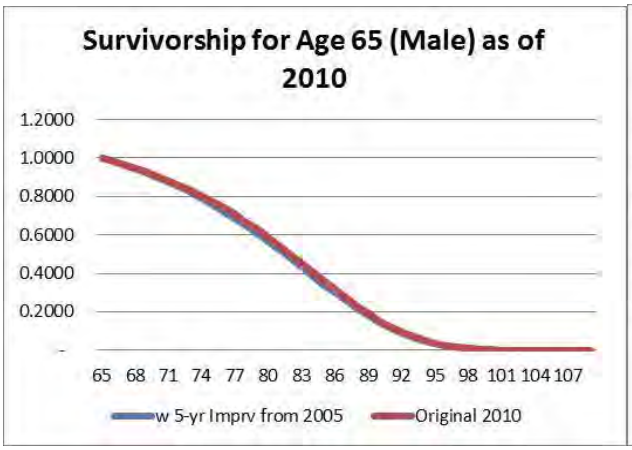


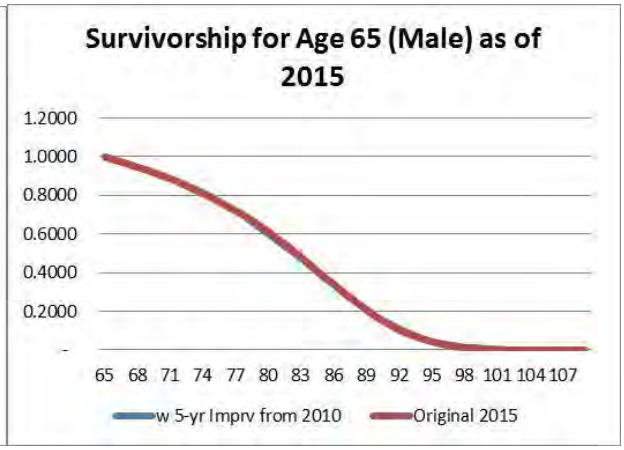
The annual improvement factor is calibrated to be 0.01 and applies to the 2015 base table. *Final Mortality = Base Mortality rates * (1 – improvement factor)^(Number of years from base table).*

Comparison below showed validation of the calibrated factor:









Appendix IV: Morbidity Improvement

In anticipation of better healthcare services and advanced technology development, we wanted to assess the benefit gaining from improved morbidity.

In the sensitivity test, we assumed the probability moving to a worse status decreases by half. Hence, increase individual's chance of staying in the same care level. In our best effort scenario, we revised the reduction to 1/3 to account for moderate improvement.

A comparison of the original and improved care transition matrices are shown below:

Original probability

		From				
		Healthy	Level 1	Level 2	Level 3	Level 4
To:	Healthy	90%	1%	0%	0%	0%
2+ ADL,90+; 1 IADL, 45	Level 1	5%	80%	1%	0%	0%
2+ ADL, 180+; 1 IADL, 120+	Level 2	3%	15%	90%	0%	0%
2+ ADL, 300+; 1 IADL, 240	Level 3	2%	4%	7%	75%	0%
2+ ADL, 420+; 1 IADL,120 N	Level 4	0%	0%	2%	25%	100%

Improved probability – Sensitivity

		From				
		Healthy	Level 1	Level 2	Level 3	Level 4
To:	Healthy	95.0%	1.0%	0.0%	0.0%	0.0%
2+ ADL,90+; 1 IADL, 45	Level 1	2.5%	89.5%	1.0%	0.0%	0.0%
2+ ADL, 180+; 1 IADL, 120+	Level 2	1.5%	7.5%	94.5%	0.0%	0.0%
2+ ADL, 300+; 1 IADL, 240	Level 3	1.0%	2.0%	3.5%	87.5%	0.0%
2+ ADL, 420+; 1 IADL,120 N	Level 4	0.0%	0.0%	1.0%	12.5%	100.0%

Improved probability – Best Effort Scenario

		From				
		Healthy	Level 1	Level 2	Level 3	Level 4
To:	Healthy	92.5%	1.0%	0.0%	0.0%	0.0%
2+ ADL,90+; 1 IADL, 45	Level 1	3.8%	84.8%	1.0%	0.0%	0.0%
2+ ADL, 180+; 1 IADL, 120+	Level 2	2.3%	11.3%	92.3%	0.0%	0.0%
2+ ADL, 300+; 1 IADL, 240	Level 3	1.5%	3.0%	5.3%	81.3%	0.0%
2+ ADL, 420+; 1 IADL,120 N	Level 4	0.0%	0.0%	1.5%	18.8%	100.0%

Appendix V: LTC in Japan

With the changes introduced in the report above, Japanese citizens can now choose their own services and service provider, insurance is provided through private companies and non-profit organizations rather than solely by the municipality, and co-payments are set by income levels. This change in policy increased the number of Japanese citizens over the age of 65 covered by insurance by more than 1.5 times between 2000 and 2015. (MHLW, 2016) In addition, though 13 million people now have an increased premium under the plan, more than 17 million have had their premium decrease, increasing the number of people insured within the country. (MHLW, 2016) As stated in McKinsey's Improving Japan's Health Care System Report: "Japan confronts a familiar and unpleasant malady: the inability to provide citizens with affordable, high-quality health care. By making the right choices, it can control health system costs without compromising access or quality—and serve as a role model for other countries." (McKinsey & Company, 2009) With the actions taken, Japan now invites communities and private companies to become a source of funding and revenue within the LTC market, a model Bellagos could consider replicating.

TEAM ZEN