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Student Research Case Study
Challenge

Bellagos LTC Social Insurance System

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Executive Summary

This report seeks to analyze the Bellagos Long Term Care (LTC) Social Insurance System. In particular, it presents a sustainability analysis of this program, and makes a series of policy recommendations to maintain its long-term sustainability.

Analysis Methodology

To analyze the sustainability of the LTC program, an Excel model with macro was used to project future cash flows from 2018 to 2028 based on assumptions made from the historical and household data provided. Projections are made individually for each household before being aggregated into population data for analysis.

For each year, net cash flow is determined as follows:

$$\text{Net cash flow} = \text{Tax Revenue} - \text{LTC Benefits} - \text{Administrative Expenses} + \text{Interest Return} \\ \text{from Investment}$$

The LTC insurance program was eventually concluded to be unsustainable based on the negative accumulated cash flow in the projection period.

Risks & Recommendations

Using the results from our model, four key risks associated with the unsustainability of the program were identified, and recommendations were proposed as summarized in the table below. Further elaboration on the benefits and trade-offs are made in the report.

	Target risks	Recommendations
1	Imminent Ageing Population	Restructured Tax System:
2	Growing Number of Beneficiaries	<ul style="list-style-type: none">- Progressive Income Tax System;- Employer Income Tax Contribution;- Increased additional Childless Employee Income Tax rate; Reforms of LTC Program Benefits: Optional One-off Payouts to Purchase Care-related Products
3	Decreasing Supply of Caregivers	Reform of LTC Program Benefits: Informal Caregiver Tax Relief; Increasing Supply of Professional Caregivers and Facilities
4	Inadequate Benefits Coverage	Subsidized Supplement LTC Private Insurance

1. Model Building for Sustainability Assessment

1.1 Tax Revenue Projection

Household incomes are estimated after adjusting for inflation, real wage growth, income growth at different ages and mortality of household members. Fertility rate is used in estimating probability of households being childless.

For each year, in each household,

$$\begin{aligned} \text{Household tax contribution} &= \text{Total Household Incomes of Member 1 and Member 2} * \\ &(\text{Standard Income Tax} + \text{Probability of Household Being Childless} * \text{Additional Childless} \\ &\quad \text{Employee Income Tax}) \end{aligned}$$

Tax contributions from each household are aggregated to determine the total tax revenues in each year.

1.2 LTC Benefits Projection

The care level transition matrix is used to determine the probability of each of member 1, 2 and 6 receiving care at each care level in each year. Home and facility care benefits for individual members are calculated after adjusting for probability at each care levels, expected benefits and their mortality.

For each year, for each of member 1, 2, 6 in each household,

$$\begin{aligned} \text{Benefit Payouts} &= \text{Home Care Benefits} * \text{Probability of Home Care} + \text{Facility Care Benefit} * \\ &\quad \text{Probability of Facility Care} \end{aligned}$$

Benefits for each household are aggregated to determine the total LTC benefits in each year.

1.3 Other Cash Flows

For each year, other cash flows are calculated as follows:

$$\text{Administrative expenses} = \text{Projected Number of Beneficiaries} * \text{Estimated Administrative Expense}$$

$$\text{Interest Return from Investments} = \text{Cash Balance at the Beginning of the Year} * \text{Short Term Interest Rate}$$

1.4 Sensitivity Testing

Our sensitivity tests reveal that cash flow results are most sensitive to changes in:

- 1) standard income tax rate,
- 2) care level transition matrix, and
- 3) percentage of beneficiaries choosing Home Care over Facility Care.

However, as 1) standard income tax rate is fixed and 2) care level transition matrix is a given underlying population characteristic, greater effort is made to more accurately estimate the 3) percentage of beneficiaries choosing Home Care over Facility Care.

Care Level	1	2	3	4
Count of Home Care	244	139	45	24
Count of Facility Care	2	5	22	191
Percentage of Home over Facility Care	99.19%	96.53%	67.16%	11.16%

Figure 1: Analysis of choice of Home Vs Facility Care

This assumption is calculated by deriving the percentages of individuals choosing home/facility care at each care level which show significant differences.

1.5 Data Limitation & Assumptions

	Data Limitation	Assumptions
1	Lack of population data.	2017 household data is representative of population; No new household is created.
2	Care transition matrix applies to those above age 65; No health status information for those younger than 65.	Health/care status of members turning 65 during projection period takes the probability of average health status of an individual 65 in 2017.
3	Lack of information about administration of the tax contribution and payout system.	Tax collection occurs at the beginning of year; Expenses and Payouts occurs at the end of each year; No net cash balance in 2016.
4	Lack of information of married couples in each household.	Newborns only possible when members 1 and 2 consist of one male and one female.
5	Annual employment credit information is unavailable for member 6.	All members above 65 assumed eligible for LTC, without consideration for criteria of two-year contribution.
6	Income information only available for members 1 and 2 up to age of 87.	Model neglects possibility of members 3-6 earning income; Individuals above age of 87 earn no income.

2. Sustainability Assessment

Subsequent figures presented in this report are based on the scale of 10,000 Bellagos households and not the population scale.

2.1 Sustainability Concern

Based on the cash flow projection from our model, the program is only sustainable till 2020, as accumulated cash flow is negative from 2021 onwards and is negative 36.2 million in 2028. Even in the best case scenario, cumulative cash balance in 2028 is negative 24.0 million. Thus, Bellagos's LTC program is unsustainable.

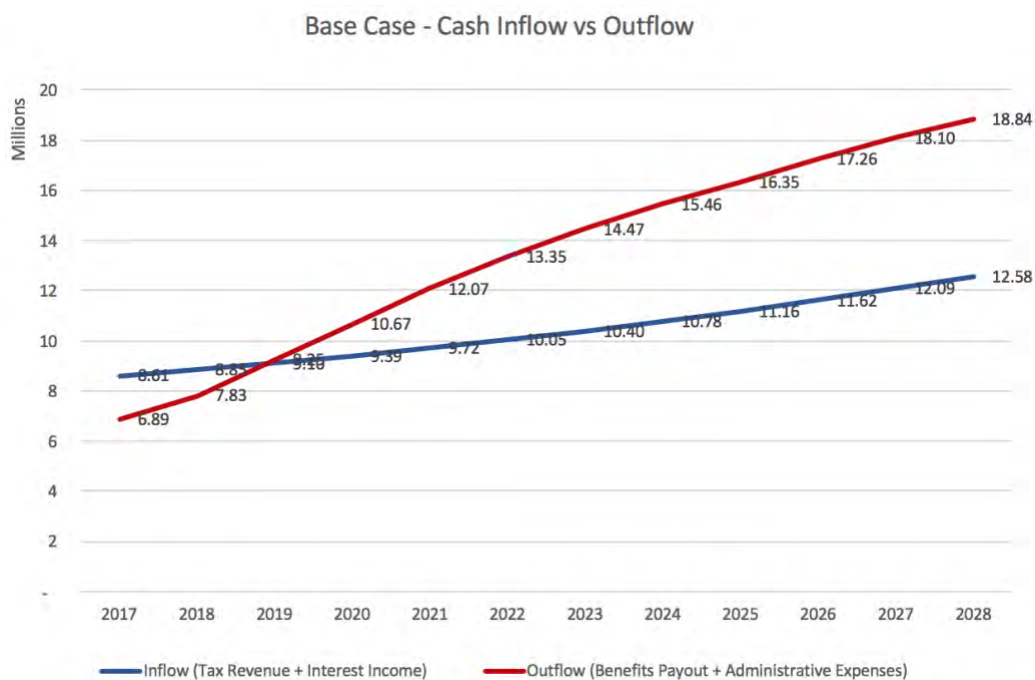


Figure 2: Projected Cash flow from 2017 to 2028

The key drivers resulting in the unsustainability are 1) excessive outflow of benefits payouts relative to tax revenue, and 2) lower rate of increase of tax revenue relative to benefits payout. To ensure the sustainability of the program, Bellagos has to adapt the LTC policy to increase tax revenue and readjust its expenses.

Another key concern is LTC program’s effectiveness in ensuring sustainability of citizens’ ability to afford LTC. This is because the current maximum benefits payouts result in falling value of benefits in the future and a gap between LTC costs and benefits. This will be further elaborated in Section 2.2.4.

2.2 Key Risks

2.2.1 Imminent Ageing Population

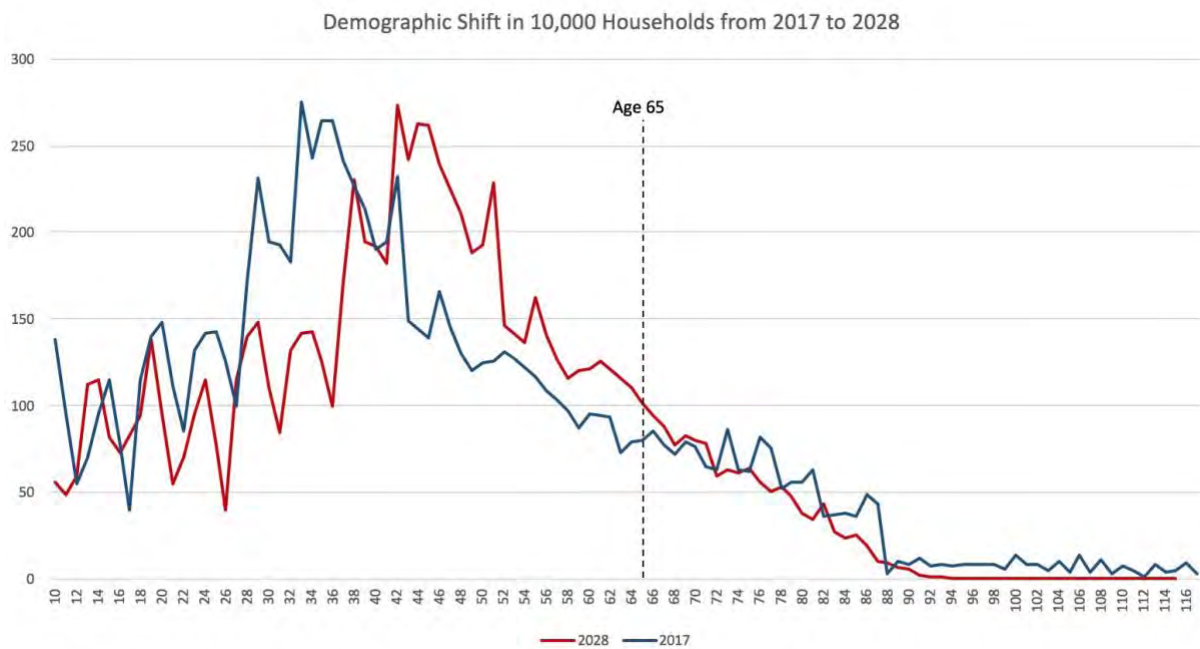


Figure 3: Demographic shift from 2017 to 2028

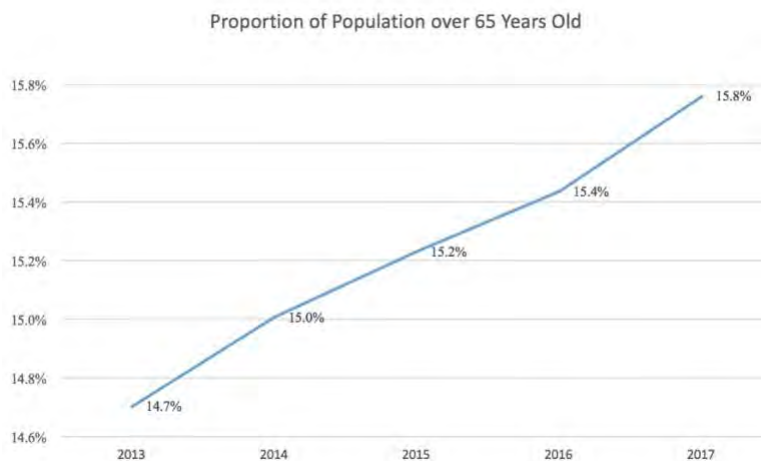


Figure 4: Increase in Proportion of Elderly Population

Based on our projection, ageing population is not a concern from 2018 to 2028, as figure 3 suggests that population size above age of 65 will not increase drastically by 2028. However, the positive transformation of population distribution in figure 3 suggests that ageing population will be a serious concern in 20-30 years as the cohort of population between age of 30 and 45 ages. Moreover, historical statistics from 2013 to 2017 reveal an increasing proportion of elderly in Bellagos’s population, as seen in figure 4.

As an ageing population usually means higher LTC benefits and lower tax revenue, it must be tackled with immediate actions before future sustainability of the program is worsened.

2.2.2 Growing Number of Beneficiaries

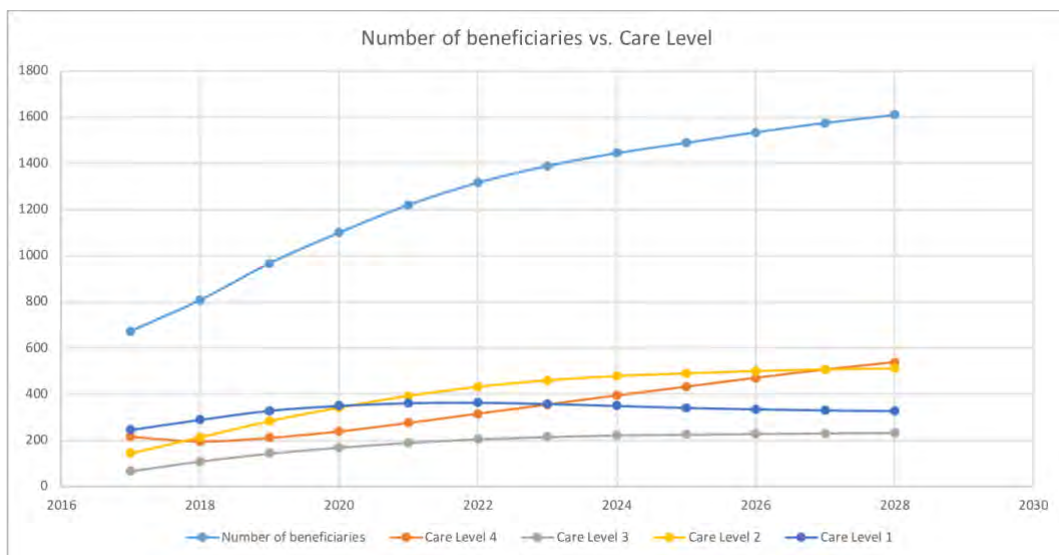


Figure 5: Estimated number of beneficiaries in future years for each care level

Projection of 10,000 households’ records shows a 130.4% increase in the number of beneficiaries from 2017 to 2028, requiring significantly larger benefit payouts to meet the LTC needs of Bellagos citizens.

2.2.3 Supply of Caregivers

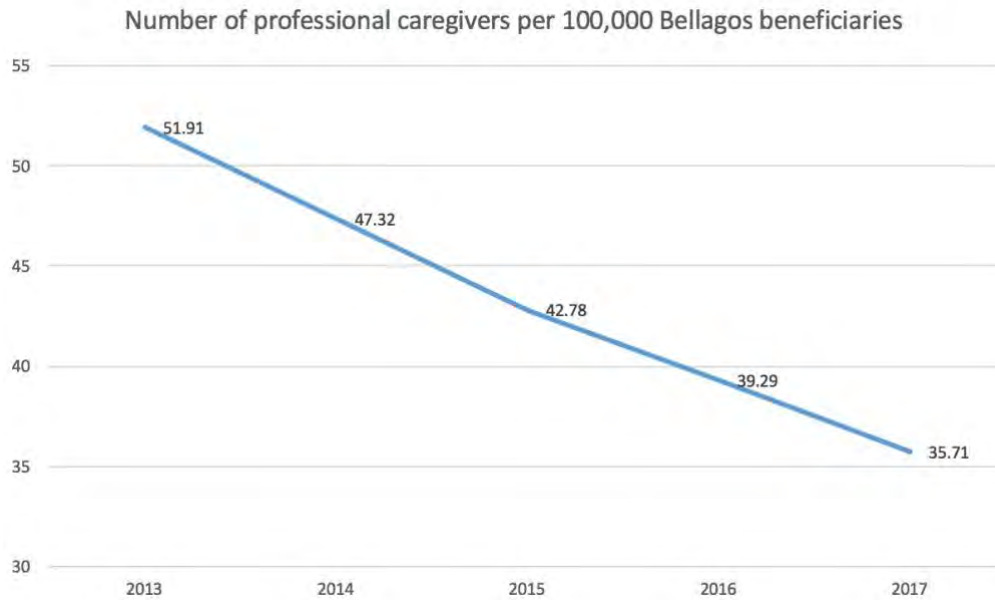


Figure 6: Decreasing Number of Professional Caregivers

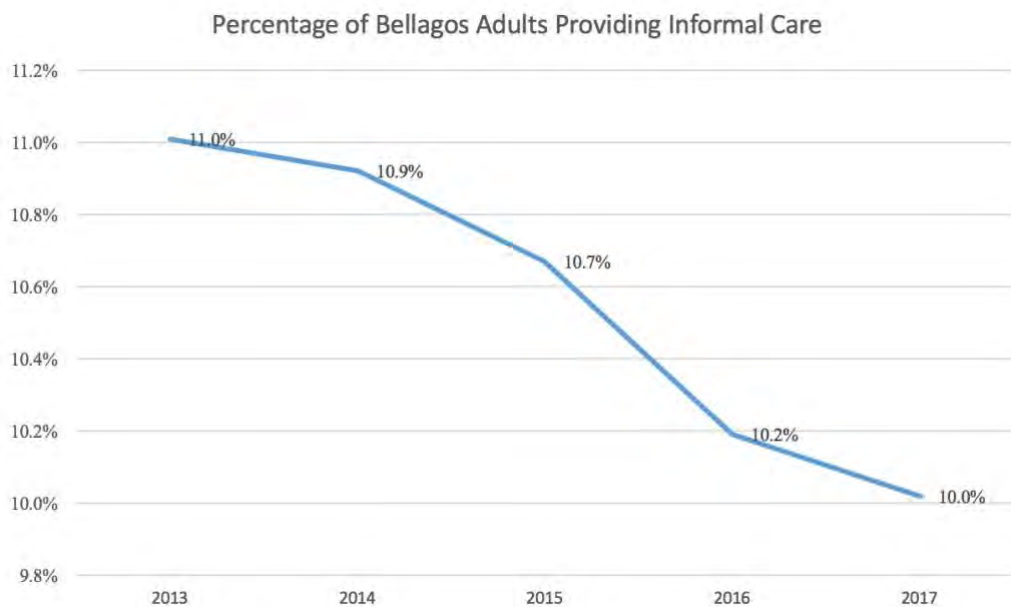


Figure 7: Decreasing Proportion of Adults Providing Informal Care

The decreasing trends of both the number of adults providing professional care and the percentage of adults providing informal care suggest an intensifying problem of insufficient caregivers. This may worsen the future unsustainability of the program.

2.2.4 Inadequate Benefits Coverage

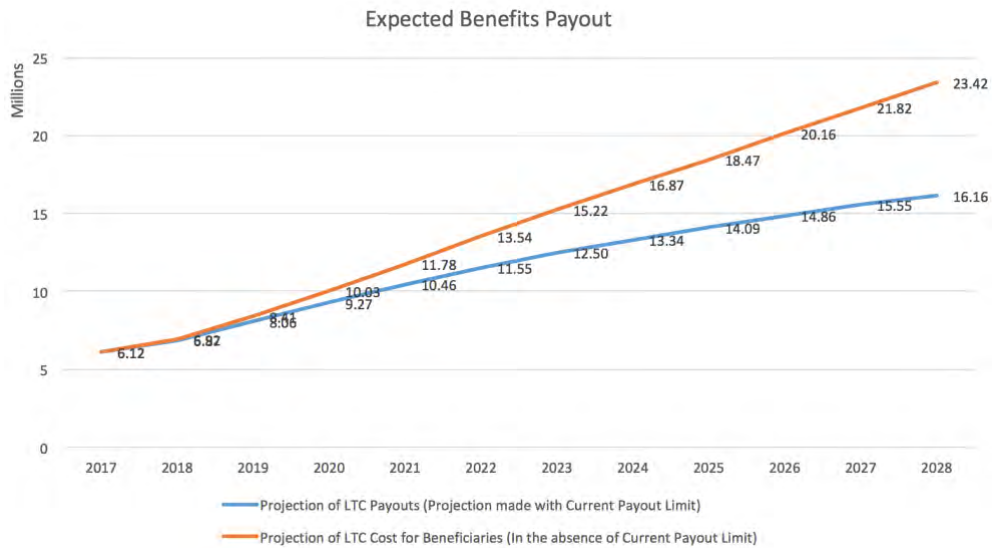


Figure 8: Increasing Gap between Projected Total LTC Payouts and Total Cost

Figure 8 shows an increasing gap between benefit payout and expected cost incurred by beneficiaries, suggesting the inability of the current payout level to support Bellagos citizens’ LTC needs, especially in the long run. This is because the current payout limit for each care level is constant for all years when medical inflation adds on to medical costs of citizens (Nadash, 2017). The global medical trend rate is significant at 8.2% in 2017 (Aon, 2017). Bellagos current LTC policy with maximum limits is not a sustainable policy to ensure citizen’s affordability of LTC in the long run.

3. Recommendations

To ensure sustainability of Bellagos's LTC program, four recommendations are proposed targeting the key risks. We adopted a conservative approach and figures used in calculations for recommendations are based on the worst case scenario with 5% adverse deviation of parameters. This results in 48.7 million negative cumulative cash balance in 2028.

3.1 Restructured Tax System

Due to the sensitivity of cash flows to changes in the tax rates, our first solution leverages on this sensitivity to increase tax revenue inflow through restructuring of tax contribution policies.

3.1.1 Progressive Income Tax System

Based on the population household income percentiles, a progressive tax structure with four brackets would be imposed on household's combined income.

Combined Chargeable Income (Member 1+Member 2)	Tax rate
<50,000	0.8%
Between 50,000 and 75,000	1.1%
Between 75,000 and 120,000	1.4%
>120,000	1.7%

Figure 9: Progressive Income Tax Rates

With the above rates, effective tax rate for those with household income less than 75,000 in 2017 is less than 0.9%, alleviating tax burden for lower-income households.

Benefits:

- 1) Ensuring equity and addressing the concern of unaffordable tax rate raised by Bellagos citizens earning lower household income.
- 2) Increase of more than 15% in tax revenue each year.

3.1.2 Increase in Additional Childless Employee Income Tax

Additional tax contribution of childless households is to increase from 0.15% to 0.30%.

Benefits:

- 1) Increase of more than 11% in tax revenue each year from 2018 to 2028.
- 2) Although the impact of this change is the least significant, this solution is useful to improve the birth rate to ease the issue of ageing population.

3.1.3 Employer Income Tax Contribution

Employer income tax contribution will be introduced at fixed rate of 0.5%.

Benefits:

- 1) Generating more than 49% increase in tax revenue each year.
- 2) Including employer participation in welfare of the country.

3.2 Reform in LTC Policies

3.2.1 Option of One-off Payout to Purchase Care-related Products

Beneficiaries can opt between one-off payout to purchase care-related products and the current monthly payouts structure. With the one-off payout, beneficiaries will receive a maximum of 1.8 years payout to purchase care-related products, and will not be eligible for payouts in the next two years. Approval will be done on case-by-case basis, whereby beneficiaries have to submit documents to prove genuine care-related purchase and need.

Benefits:

- 1) Generating 3 million of additional cumulative cash inflows at the end of 2028.
- 2) Reducing LTC benefits expense, albeit minor.
- 3) Providing flexibility for citizens to purchase care-related products which are currently of interest to 77% of citizens. These care-related products such as medical alert systems can help beneficiaries stay autonomous.
- 4) Potential for further reduction in expenses when:
 - a) reliance of beneficiaries in LTC in the future is reduced when beneficiaries are empowered to be autonomous, hence reducing future payouts.
 - b) adoption of home over facility care increases due to possibility of being autonomous – 93% of citizens prefer staying at home.
 - c) expense savings will be magnified should LTC policies be modified to increase maximum payouts in the future.

3.2.2 Informal Caregiver Tax Relief

Informal caregivers will be given an income tax relief of 1% with a minimum of \$500 annually, on top of the current informal caregiver allowance.

Benefits:

- 1) Increasing number of informal caregivers, easing the predicted situation of insufficient professional caregiver in the future.
- 2) Potentially increasing proportion of home over facility care in the future, hence generating 2.5 million of additional cumulative cash inflows at the end of 2028, when the decrease in benefit payouts exceeds cost of tax relief.

3.3 Increase Supply of Professional Caregivers and Facilities

Bellagos should proactively seek to increase the supply of caregivers. Scholarships or subsidies with bonds can be offered for students undergoing education related to professional care. Moreover, a separate fund is to be used to develop more long-term care facilities in the face of increasing healthcare demands.

Benefits:

- 1) Greater certainty in the supply of professional caregivers in the future.
- 2) Preparing the country for the future ageing population.

3.4 Subsidized Supplement LTC Private Insurance

To expand coverage while limiting costs, Bellagos could engage the private sector to offer Subsidized Supplement LTC Insurance by private direct insurers. Qualified Supplemental LTC insurance policies are given subsidies to drive supply and ensure affordability of policies.

Benefits:

- 1) Risk transfer from the government to insurance companies to reduce the burden placed on the government as the main provider of LTC by stimulating growth of private LTC insurance in Bellagos.
- 2) Encouraging individuals to take greater responsibility of their own health by paying for their own private LTC insurance.
- 3) Addressing inadequacy of healthcare coverage of current LTC policies with maximum benefits to meet future healthcare needs.

4. Trade-offs

4.1.1 Progressive Tax System

- 1) Based on the survey, majority of the population especially the lower-income will be unhappy with changes.
- 2) If changes are significant, it might cause brain drain from the higher-income class in Bellagos.

4.1.2 Increase in Additional Childless Employee Income Tax

- 1) Childless families might feel discriminated by this tax policy.
- 2) This may increase the burden on many families who are already less wealthy.

4.1.3 Employer Income Tax Contribution

- 1) An employer tax would increase the cost of employing a citizen, possibly resulting in the choice a foreign employee over a local one.
- 2) Increase cost of employment might hinder foreign direct investments into Bellagos.

4.2.1 Option of One-off Payout to Purchase Care-related Products

- 1) The one-off payment might result in inappropriate or unwise use of funds by some individuals.

4.2.2 Informal Caregiver Tax Relief

- 1) There is uncertainty in the effectiveness of the tax relief on the number of people providing informal care, especially when effectiveness of tax relief differs between countries due to cultural and social differences.
- 2) A substantial amount of tax relief may be needed to increase the supply of informal caregivers which may put a strain on the government's budget.

4.3 Increase Supply of Professional Caregivers and Facilities

- 1) Subsidizing the education by providing scholarships for healthcare education and building more care facilities can be costly.
- 2) Estimating the number of people that require facility and professional care in the future can be challenging but important to determine the right amount of resources to be allocated to building such facilities.

4.4 Subsidized Supplement LTC Private Insurance

- 1) In the future, increasing benefits for the current LTC has to be considered carefully as increasing benefits might discourage people from getting private insurance as they might feel that the LTC program is sufficient. This was evident in Germany where demand for supplementary insurance has decreased in 2015 after the introduction of the reform (Nadash, 2017).
- 2) Choice of qualified private insurer's policies must be carefully assessed as it has the potential to promote unfair competition in the private insurance market for LTC.
- 3) Subsidizing private insurance could be costly. However, if subsidy is not substantial, problems of equity might occur as poorer individuals might not be able to afford the subsidized private insurance.

5. Conclusion

Our model has given us a clearer understanding about the Bellagos LTC insurance program, allowing us to identify the four key risks threatening its sustainability. A combination of all the above recommendations is required to comprehensively tackle the unsustainability of the program as none of the individual recommendations alone is sufficient to mitigate the risks. Our solutions seek to generate greater revenue inflow, while restructuring the LTC program to allow for greater flexibility and preparation for the impending ageing population. With all recommendations in place, the cumulative cash balance of the program is projected to increase from negative 48.7 million initially to positive 37.5 million in 2028.

References

Aon. (2017). 2017 Global Medical Trends. Retrieved from http://www.aon.com/attachments/human-capital-consulting/2017_GB_Trends_brochure_20170105.pdf

Nadash, P., & Cuellar, A. E. (2017). The emerging market for supplemental long term care insurance in Germany in the context of the 2013 Pflege-Bahr reform. *Health Policy*, 121(6), 588-593. doi:10.1016/j.healthpol.2017.03.006

Appendix (VBA Codes)

Option Explicit

Sub SensitivityTesting()

Dim shtSTP As Worksheet

Dim shtSTR As Worksheet

Dim shtSM As Worksheet

Dim sht

Dim STMax As Integer

Dim STMin As Integer

Dim STNo As Integer

Dim n As Integer

Dim sensitivityChange As Variant

Dim rng As range

Dim StartTime As Double

Dim SecondsElapsed As Double

StartTime = Timer

Set shtSTP = ActiveWorkbook.Worksheets("Sensitivity Testing Parameters")

Set shtSM = ActiveWorkbook.Worksheets("Summary")

Set shtSTR = ActiveWorkbook.Worksheets("Sensitivity Testing Results")

Set rng = shtSM.range("A3:M9")

Application.Calculation = xlCalculationManual

Application.ScreenUpdating = False

STMin = shtSTP.range("F3")

STMax = shtSTP.range("F4")

sensitivityChange = shtSTP.range("F5")

```
shtSTR.range("Q1:AC1000").ClearContents
```

'Base results

```
shtSTP.range("C" & STMin & ":C" & STMax & "").Value = 0
```

```
Calculate
```

```
Call HHProjection
```

```
shtSTR.range("Q1") = "Base Results"
```

```
shtSTR.range("Q2").Resize(rng.Rows.Count, rng.Columns.Count).Cells.Value =  
rng.Cells.Value
```

'Sensitivity test results

```
For STNo = STMin To STMax
```

```
  For n = 1 To 2
```

```
    If n = 1 Then
```

```
      shtSTP.range("C" & STNo & "").Value = sensitivityChange
```

```
      shtSTR.range("Q" & (10 + (STNo - 3) * 18 + (n - 1) * 9) & "") = shtSTP.range("B" &  
STNo & "") + " +" + Format(sensitivityChange, "Percent")
```

```
    Else
```

```
      shtSTP.range("C" & STNo & "").Value = -sensitivityChange
```

```
      shtSTR.range("Q" & (10 + (STNo - 3) * 18 + (n - 1) * 9) & "") = shtSTP.range("B" &  
STNo & "") + " -" + Format(sensitivityChange, "Percent")
```

```
    End If
```

```
  Calculate
```

```
  Call HHProjection
```

```
  shtSTR.range("Q" & (11 + (STNo - 3) * 18 + (n - 1) * 9) & "").Resize(rng.Rows.Count,  
rng.Columns.Count).Cells.Value = rng.Cells.Value
```

```
Next n
```

```
  shtSTP.range("C" & STNo & "").Value = 0
```

```
Next STNo
```

```
shtSTP.range("C" & STMin & ":C" & STMax & "").Value = 0
```


Calculate

Application.ScreenUpdating = True

SecondsElapsed = Round(Timer - StartTime, 2)

MsgBox "Run Completed." & Chr(13) & Chr(10) & "Time Taken: " & SecondsElapsed & " seconds"

End Sub

Sub HHProjection()

Dim shtHH As Worksheet

Dim shtTRP As Worksheet

Dim shtBPP As Worksheet

Dim shtPP As Worksheet

Dim shtCL As Worksheet

Dim shtSM As Worksheet

Dim HHno As Integer

Dim HHnoMax As Integer

Dim HHnoMin As Integer

'Dim StartTime As Double

'Dim SecondsElapsed As Double

'StartTime = Timer

Set shtHH = ActiveWorkbook.Worksheets("Household Projection")

Set shtTRP = ActiveWorkbook.Worksheets("Tax Revenue Projection")

Set shtBPP = ActiveWorkbook.Worksheets("Benefits Payout Projection")

Set shtPP = ActiveWorkbook.Worksheets("Population Projection")

```
Set shtCL = ActiveWorkbook.Worksheets("Care Level Projection")
```

```
Set shtSM = ActiveWorkbook.Worksheets("Summary")
```

```
Application.Calculation = xlCalculationManual
```

```
Application.ScreenUpdating = False
```

```
shtPP.range("B2:N130").ClearContents
```

```
shtPP.range("P2:AA130").ClearContents
```

```
shtTRP.range("B3:M10002").ClearContents
```

```
shtBPP.range("B3:M10002").ClearContents
```

```
shtCL.range("B2:M6").ClearContents
```

```
HHnoMin = shtHH.range("F1")
```

```
HHnoMax = shtHH.range("F2")
```

```
For HHno = HHnoMin To HHnoMax
```

```
    shtHH.range("B2") = HHno
```

```
    shtHH.Calculate
```

```
    Call HHTaxProjection
```

```
    Call HHBenefitsProjection
```

```
    Call HHPopulationProjection
```

```
    Call HHCareLevelProjection
```

```
Next HHno
```

```
shtTRP.Calculate
```

```
shtBPP.Calculate
```

```
shtSM.Calculate
```

```
Calculate
```

```
Application.ScreenUpdating = True
```

```
'SecondsElapsed = Round(Timer - StartTime, 2)
```

```
'MsgBox "Run Completed." & Chr(13) & Chr(10) & "Time Taken: " & SecondsElapsed & "
seconds"
```

```
End Sub
```

```
Sub HHTaxProjection()
```

```
Dim shtHH As Worksheet
```

```
Dim shtTRP As Worksheet
```

```
Dim HHno As Integer
```

```
Dim n As Integer
```

```
Set shtHH = ActiveWorkbook.Worksheets("Household Projection")
```

```
Set shtTRP = ActiveWorkbook.Worksheets("Tax Revenue Projection")
```

```
HHno = shtHH.range("B2")
```

```
shtTRP.Cells(2 + HHno, 1) = HHno
```

```
For n = 1 To 12
```

```
    shtTRP.Cells(2 + HHno, n + 1) = shtHH.Cells(10 + n, 63)
```

```
Next n
```

```
End Sub
```

```
Sub HHBenefitsProjection()
```

```
Dim shtHH As Worksheet
```

```
Dim shtBPP As Worksheet
```

```
Dim HHno As Integer
```

```
Dim n As Integer
```

```
Set shtHH = ActiveWorkbook.Worksheets("Household Projection")
Set shtBPP = ActiveWorkbook.Worksheets("Benefits Payout Projection")
```

```
HHno = shtHH.range("B2")
```

```
shtBPP.Cells(2 + HHno, 1) = HHno
```

```
For n = 1 To 12
```

```
    shtBPP.Cells(2 + HHno, n + 1) = shtHH.Cells(10 + n, 64)
```

```
Next n
```

```
End Sub
```

```
Sub HHPopulationProjection()
```

```
Dim shtHH As Worksheet
```

```
Dim shtPP As Worksheet
```

```
Dim M1Age As Variant
```

```
Dim M2Age As Variant
```

```
Dim M3Age As Variant
```

```
Dim M4Age As Variant
```

```
Dim M5Age As Variant
```

```
Dim M6Age As Variant
```

```
Dim M1Gender As Variant
```

```
Dim M2Gender As Variant
```

```
Dim M3Gender As Variant
```

```
Dim M4Gender As Variant
```

```
Dim M5Gender As Variant
```

```
Dim M6Gender As Variant
```

```
Dim n As Integer
```

Set shtHH = ActiveWorkbook.Worksheets("Household Projection")

Set shtPP = ActiveWorkbook.Worksheets("Population Projection")

M1Age = shtHH.range("D11")

M2Age = shtHH.range("S11")

M3Age = shtHH.range("AH11")

M4Age = shtHH.range("AL11")

M5Age = shtHH.range("AP11")

M6Age = shtHH.range("AT11")

M1Gender = shtHH.range("B5")

M2Gender = shtHH.range("C5")

M3Gender = shtHH.range("D5")

M4Gender = shtHH.range("E5")

M5Gender = shtHH.range("F5")

M6Gender = shtHH.range("G5")

For n = 1 To 12

 If M1Age <> "xxx" Then

 If M1Gender = 1 Then

 shtPP.Cells(1 + M1Age + n, n + 1) = shtPP.Cells(1 + M1Age + n, n + 1) +
shtHH.Cells(10 + n, 13)

 Else

 shtPP.Cells(1 + M1Age + n, n + 15) = shtPP.Cells(1 + M1Age + n, n + 15) +
shtHH.Cells(10 + n, 13)

 End If

 End If

 If M2Age <> "xxx" Then

 If M2Gender = 1 Then

 shtPP.Cells(1 + M2Age + n, n + 1) = shtPP.Cells(1 + M2Age + n, n + 1) +
shtHH.Cells(10 + n, 28)

```

Else
    shtPP.Cells(1 + M2Age + n, n + 15) = shtPP.Cells(1 + M2Age + n, n + 15) +
shtHH.Cells(10 + n, 28)
End If
End If

If M3Age <> "xxx" Then
    If M3Gender = 1 Then
        shtPP.Cells(1 + M3Age + n, n + 1) = shtPP.Cells(1 + M3Age + n, n + 1) +
shtHH.Cells(10 + n, 37)
    Else
        shtPP.Cells(1 + M3Age + n, n + 15) = shtPP.Cells(1 + M3Age + n, n + 15) +
shtHH.Cells(10 + n, 37)
    End If
End If

If M4Age <> "xxx" Then
    If M4Gender = 1 Then
        shtPP.Cells(1 + M4Age + n, n + 1) = shtPP.Cells(1 + M4Age + n, n + 1) +
shtHH.Cells(10 + n, 41)
    Else
        shtPP.Cells(1 + M4Age + n, n + 15) = shtPP.Cells(1 + M4Age + n, n + 15) +
shtHH.Cells(10 + n, 41)
    End If
End If

If M5Age <> "xxx" Then
    If M5Gender = 1 Then
        shtPP.Cells(1 + M5Age + n, n + 1) = shtPP.Cells(1 + M5Age + n, n + 1) +
shtHH.Cells(10 + n, 45)
    Else
        shtPP.Cells(1 + M5Age + n, n + 15) = shtPP.Cells(1 + M5Age + n, n + 15) +

```

```
shtHH.Cells(10 + n, 45)
```

```
End If
```

```
End If
```

```
If M6Age <> "xxx" Then
```

```
    If M6Gender = 1 Then
```

```
        shtPP.Cells(1 + M6Age + n, n + 1) = shtPP.Cells(1 + M6Age + n, n + 1) +
```

```
shtHH.Cells(10 + n, 55)
```

```
    Else
```

```
        shtPP.Cells(1 + M6Age + n, n + 15) = shtPP.Cells(1 + M6Age + n, n + 15) +
```

```
shtHH.Cells(10 + n, 55)
```

```
    End If
```

```
End If
```

```
Next n
```

```
End Sub
```

```
Sub HHCareLevelProjection()
```

```
Dim shtHH As Worksheet
```

```
Dim shtCL As Worksheet
```

```
Dim n As Integer
```

```
Dim x As Integer
```

```
Set shtHH = ActiveWorkbook.Worksheets("Household Projection")
```

```
Set shtCL = ActiveWorkbook.Worksheets("Care Level Projection")
```

```
For n = 1 To 12:
```

```
    For x = 0 To 4
```

'Member 1

shtCL.Cells(2 + x, n + 1) = shtCL.Cells(2 + x, n + 1) + (shtHH.Cells(10 + n, 8 + x) *
shtHH.Cells(10 + n, 13))

'Member 2

shtCL.Cells(2 + x, n + 1) = shtCL.Cells(2 + x, n + 1) + (shtHH.Cells(10 + n, 23 + x) *
shtHH.Cells(10 + n, 28))

'Member 6

shtCL.Cells(2 + x, n + 1) = shtCL.Cells(2 + x, n + 1) + (shtHH.Cells(10 + n, 50 + x) *
shtHH.Cells(10 + n, 55))

Next x

Next n

End Sub