DRAFT FOR DISCUSSION
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MONGOLIA

PENSION POLICY REFORM OPTIONS

April 15, 2020

Human Development Unit
East Asia and Pacific Region

List of Acronyms

CPI	Consumer Price Index
DB	Defined Benefit
DC	Defined Contribution
FDC	Funded Defined Contribution
GDP	Gross Domestic Product
IMF	International Monetary Fund
MLSP	Ministry of Labour and Social Protection
NDC	Notional Defined Contribution
PIF	Pension Insurance Fund
PROST	Pension Reform Options Simulation Toolkit
SIGO	Social Insurance General Office
TSP	Tested Social Pension

Acknowledgements

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Executive Summary

This report is the latest in a series of World Bank reports on pensions in Mongolia and was prepared in late 2019 at the request of the Ministry of Labour and Social Protection.[1] The Ministry sought guidance in respect to measures to improve the long-term sustainability and adequacy of the Pension Insurance System including: (i) revision of the baseline projections of using the Pensions Reform Options Simulation Toolkit (PROST) and simulation of select parametric reforms; (ii) evaluation of the merits of retaining, removing or modifying the Notional Defined Contribution (NDC) scheme; and (iii) evaluation of options for modifying the current minimum pension and establishment of a non-contributory social pension. In addition, this report discusses the key reasons why replacing the existing pay-as-you-go defined benefit scheme with a funded defined contribution (FDC) scheme would result in additional fiscal costs, shoulder workers and retirees with unmanageable risks, and require systems, institutions and supervision which is not in place and would take several years to establish.

Since this analysis was prepared in December 2019, the corona virus has substantially affected Mongolia's economy and society and will impact pensions and other social insurance. The impact will depend on how adversely the economy is affected, how long and deep is an economic slowdown, and how the fiscal position and social insurance finances are impacted. Declines in economic activity will reduce the revenue streams for pensions. At the same time, some pension costs may increase as eligible workers elect to retire and some workers file for disability benefits. Unemployment benefits may also increase.

The six month exemption of private entities from social insurance contributions is expected to reduce revenues to the Pension Insurance scheme up to about 1.7% of GDP, depending upon the number of workers who continue to have labor contracts during this period (Table 1). An additional 0.6% of GDP is estimated to be lost from exemption of other Social Insurance contributions. Under the program, pensions and other social insurance benefits (such as unemployment insurance, maternity benefits, accident and short-term disability insurance) will accrue for affected workers so much of the additional cost will be incurred by the Government over time. This results in a cost for the Government over the next 20-50 years. For pensions, this cost may range between 6% and 9% of GDP, though it is not an immediate fiscal cost.

The projected growth in public expenditures for pensions is primarily driven by the insufficiency of the contribution rate compared with the benefits promised and the retirement age of 55 for women and 60 for men. A growing elderly population will qualify for pensions increasing required expenditures.

We recommend the following parametric reforms to improve to reduce the growth of public expenditures while also making the pensions system more equitable and benefits more predictable:

- **Indexation**. It is suggested to adopt a policy of automatic indexation for pension benefits which is calculated as the growth in the consumer price index. In addition, the minimum pension should be indexed to the CPI and eventually be replaced by a non-contributory Tested Social Pension (TSP).
- **Wage base extension and valorization**. The wage base for calculating pensions should gradually be increased from the current 7 years to a worker's lifetime wages and the wage base indexed or

[1] See World Bank, 2018, *Mongolia: Public Expenditure Review*, June 2018; World Bank, 2018, *Mongolia: Policy Options for Pension Reform*, May 1, 2018; World Bank, 2012, *Mongolia: Policy Options for Pension Reform*, January 20, 2012; World Bank, 2008, *Mongolia: Pension Policy Challenges and Reform Options*, July 28, 2008; Louise Fox, 2002, *Mongolia: Cash Transfers and Social Protection Programs*, draft mimeo, March 25, 2002.

"valorized" according to the average growth in covered wages.[2] This would improve incentives, equity between workers and reduce the tendency for some workers to materially increase their wages 7 years before retirement, especially in the voluntary scheme.

- **Actuarially fair benefit reduction for early retirement**. Mongolia has one of the lowest retirement ages in the region and provisions for 5-10 years early retirement even below the already very low retirement ages.[3] The proposed policy would include: (i) An actuarially fair penalty applied to the retirement benefit for those retirees retiring prior to the prevailing retirement eligibility age and an actuarially fair supplement for those retiring after the eligibility age; (ii) the retirement benefit eligibility age would increase at a rate of 3 months per year until it reaches age 65 (after 20 years for men and 40 years for women); and (iii) early retirement provisions for Mother Heroes and special professions should also phase out at a rate of 3 months per year of early retirement. Linking the eligibility age to life expectancy at such age could also be considered.
- **Increase in the payroll contribution rate**. Returning to a combined contribution rate to 19%, as it had been between 1994 and 2008 is suggested once Mongolia's economy stabilizes and returns to growth. Similarly, it is proposed to increase the contribution rate by 2.0% for the voluntary scheme (from a total of 12.0% to 14.0%) over the same period.

PROST projections suggest that the combined effects of these changes would be to stabilize the required State Subsidy at about 1-2% of GDP per year. If the authorities were only to adopt inflation-based indexation, this single reform could stabilize the State Subsidy at about 4% of GDP.

1. ***The Notional Defined Contribution Scheme suffers from a number of weaknesses in design and implementation and it would be best for Mongolian policy makers to remove it entirely from the pension law***

Key weaknesses include:

- The NDC scheme has no transition between cohorts resulting in an abrupt reduction in the anticipated replacement rate for most new retirees born in 1979 when compared to those born before. This is inequitable and very likely difficult to apply without a transition mechanism.
- The abrupt decline in the replacement rate would increase the already high proportion of retirees entitled to the minimum pension further increasing the incentives to underreport wages.
- The design has not set out a proper earmarking of contributions or apportionment of risks for disability and survivorship benefits.
- The 1999 amendment created confusion between the objectives of the NDC scheme and the aspirational goal of transitioning to a Funded Defined Contribution Scheme.[4] There has been and continues to be widespread confusion over the nature of an FDC scheme.

Virtually all of the beneficial features of the NDC scheme can be achieved through automatically adjusting parameters in the existing DB scheme as suggested in this report. As such, we believe that the NDC scheme should be eliminated from the legislation along with the parametric reforms proposed.

[2] This could be increased at a rate of one year increase per year so that the scheme would include 30 years of wages in 23 years.

[3] The retirement age is 55 for women and 60 for men. Herders meeting specified criteria can retire 5 years early. Workers in hazardous professions and working in "high heat" can also retire early. Women with 4 or more children can retire and a majority of women retirees have been able to meet this criteria. Other special professions have distinct early retirement provisions.

[4] The text of the amendment specifies that the NDC design is based on pay-as-you-go financing whereby contributions are used to pay current benefits and, in addition, a substantial State Subsidy is needed to address the shortfall between contributions and benefits. Notably, the benefit formula is defined in the amendment and is not in any way connected to the rate of return on reserves under management.

2. *Reform is Needed of the Minimum Pension and Establishment of a Tested Social Pension is recommended which would be universal for all elderly*

The current minimum pension and vesting periods for partial and full pensions create fragmented incentives and leave many workers vulnerable to poverty if they do not meet the vesting requirements. A stronger design would be a non-contributory Tested Social Pension (TSP) financed from general revenues which could apply to all elderly over a qualifying age while also eliminating the minimum pension in the Pension Insurance Scheme. A TSP could have a clawback feature as follows: Every Mongolian citizen over an age to be specified could qualify, regardless of their years of contributions to the pension system. The TSP would, after a transition period, replace the minimum pension in the Pension Insurance Scheme. The proposed clawback could reduce the TSP by 50% of the individual's pension benefit. When the individual's pension is twice the amount of the TSP, the individual would no longer be entitled to any TSP benefit. For example, suppose that the TSP was 250,000 Tug and the retiree's pension was 100,000 Tug. The individual would receive their 100k pension in full plus the TSP (250k minus 50% or 125k) for a total pension of 225k.

3. *A Funded Scheme is neither advisable nor feasible in Mongolia*

An FDC scheme in Mongolia would substantially increase the required fiscal costs for about 30 years, depending upon parameters.[5] When a country moves from an unfunded scheme to a Fully Funded scheme, all new contributions and investment returns need to be placed in fund(s) and the current contributions of affected cohorts cannot be used to finance the pension benefits of current retirees. After about 32 years, PROST projections of an FDC scheme begins to finance pensions from its accumulated reserves and therefore the burden of financing pensions shifts from the state to the individual. With contributions diverted to accumulate reserves in a separate fund, the Government therefore has to increase its State Subsidy to ensure that current retirees receive all the benefits they have been promised.

The risks of establishing an FDC scheme outweigh the benefits in Mongolia so this policy option is not recommended. The required fiscal costs are substantial while the benefits are highly uncertain. In addition, substantial investments in regulation, supervision, and information infrastructure are needed before such a scheme could function befitting of the public trust.

Many of the benefits of an FDC scheme can be achieved through the parametric reforms to the PAYG DB scheme we have recommended without requiring additional fiscal costs or subjecting workers to the same level of risk. For example, establishing automatic valorization of the wage base creates and adjuster through the course of an individual's worklife. Actuarially fair adjustments to benefits according to the life expectancy at the retirement age also emulates the calculation of an annuity under an FDC plan.

4. *A combined program of Parametric reforms and a Tested Social Pension can substantially improve the sustainability, equity and predictability of Mongolia's pensions*

The longer the authorities wait to enact parametric reforms the more costly will be the pension system and the more difficult will be the transition in implementing the reforms. Enactment of

[5] Projections for Mongolia suggest that these costs are about 2.5% of GDP when the reform is introduced and these decline to zero after about 32 years.

automatic price indexation of pensions will have no adverse effect on pensions in the short-run and will only gradually affect pension benefits. Extension of the wage base for pensions will have a negligible effect on benefits yet improve incentives. These two parametric reforms could therefore benefit workers through fairness, equity and predictability of benefits while also improving pension sustainability.

Adoption of a Tested Social Pension to replace the current minimum pension would ensure that all Mongolian retirees have a minimum level of old age income protection. It would also address current vesting rules which make it very difficult for some individuals to enter the labor force in middle age.

The constructive impact of these reforms and the limited effect on retirees should therefore make these reforms attractive even in the current circumstances.

Mongolia: Pension Policy Reform Options – April 14, 2020 - DRAFT

I. Background and Objectives

This report was prepared in late 2019 at the request of the Ministry of Labour and Social Protection. The Ministry sought guidance in respect to three areas: (i) Revision of the baseline PROST projections and simulation of select parametric reforms as discussed in December 2019; (ii) evaluation of the merits of retaining, removing or modifying the Notional Defined Contribution (NDC) scheme; and (iii) evaluation of options for modifying the current minimum pension and establishment of a non-contributory social pension. In addition, we have outlined the key reasons why we believe that replacing the existing pay-as-you-go defined benefit scheme with a funded defined contribution scheme would result in additional fiscal costs, shoulder workers and retirees with unmanageable risks, and require systems, institutions and supervision which is not in place and would take several years to establish.

We revised this report in March-April 2020 to provide initial reflections on the impact of the corona virus on Mongolia's pension system. We reflect on the stimulus program below.

II. Corona Virus Update

Since this analysis was prepared in December 2019, the corona virus has substantially affected Mongolia's economy and society and will impact pensions and other social insurance. The impact will depend on how adversely the economy is affected, how long and deep is an economic slowdown, and how the fiscal position and social insurance finances are impacted. Declines in economic activity will reduce the revenue streams for pensions. At the same time, some pension costs may increase as eligible workers elect to retire and some workers file for disability benefits. Unemployment benefits may also increase.

The six month exemption of private entities from social insurance contributions is expected to reduce revenues to the Pension Insurance scheme up to about 1.74% of GDP, depending upon the number of workers who continue to have labor contracts during this period (Table 1). An additional 0.6% of GDP is estimated to be lost from exemption of other Social Insurance contributions (unemployment insurance, industrial accident insurance, maternity and short-term disability). Participation in the voluntary scheme will likely increase as there is no contribution required for these workers.

Table 1: 2020 Stimulus Package: Est. Loss of Premium Revenue & Future Benefit Costs

	Scenario 1	Scenario 2
Accrual Rate/year	1.50%	2.25%
Accrual Rate for 6 months	0.75%	1.13%
	Percent of GDP	
Pension Revenues (% of GDP - 2020)	3.48%	3.48%
Pension Costs as a % of GDP (2020)	5.40%	5.40%
Wages as % of GDP (projected 2020)	36.10%	36.10%
Wages * accrual rate (% of GDP)	0.27%	0.41%
Future Benefits (Annual accrued benefit * 19.4 years)	5.25%	7.88%
Lost Premiums (Six Months - Other Social Insurance excl. Health - 1% Accident Ins.)	0.54%	0.54%
Lost Premiums (Six Months - Other Social Insurance excl. Health - 3% Accident Ins.)	0.90%	0.90%
Lost Premiums (Pensions)	1.74%	1.74%
Total Lost Premiums (with 1% Contribution to Accident Insurance)	2.28%	2.28%
Total Lost Premiums (with 3% Contribution to Accident Insurance)	2.64%	2.64%
Total Cost (Lost Premiums + Future Benefits - 1% Accident Ins)	7.54%	10.16%
Total Cost (Lost Premiums + Future Benefits - 3% Accident Ins)	7.90%	10.52%

Source: Bank estimates using PROST.
*Notes: Scenario 1 assumes that the worker is vested and therefore is accruing rights at a rate of 1.5% of wages per year which for six months would be 0.75%. Scenario 2 assumes that the worker is not vested and therefore is accruing rights at a rate of 2.25% of wages per year which for six months would be 1.13%. The contribution rate for accidental injury insurance ranges from 1% to 3% of wages. We have multiplied the annual benefit (as a % of GDP) * 19.4 which is the approximate combined life expectancy at retirement age for men and women. According to UN Population Projections, life expectancy at retirement age for 2020 is projected to be 15.4 years for men and 23.4 years for women.*

Under the program, pensions and other social insurance benefits (such as unemployment insurance, maternity benefits, accident and short-term disability insurance) will accrue for affected workers so much of the additional cost will be incurred by the Government over time. This results in a cost for the Government over the next 20-50 years. For pensions, this cost may range between 6% and 9% of GDP, though it is not an immediate fiscal cost.

The exemption of social insurance contributions in the April 2020 stimulus program is fiscally expensive and regressive. The program would be more beneficial for people with higher salaries so the measure is regressive. A more advisable alternative would be for the authorities to limit the social insurance contribution exemption to a cap, such as the contribution levied on only the minimum wage. In addition, the exemption has no inducement to incentivize employers to keep workers on their payrolls.

We do not expect the temporary exemption or the possible economic downturn to materially change the PROST projections underlying the analysis in this report. The assumptions and data in the projections therefore have not been modified since the onset of the Covid-19 crisis.

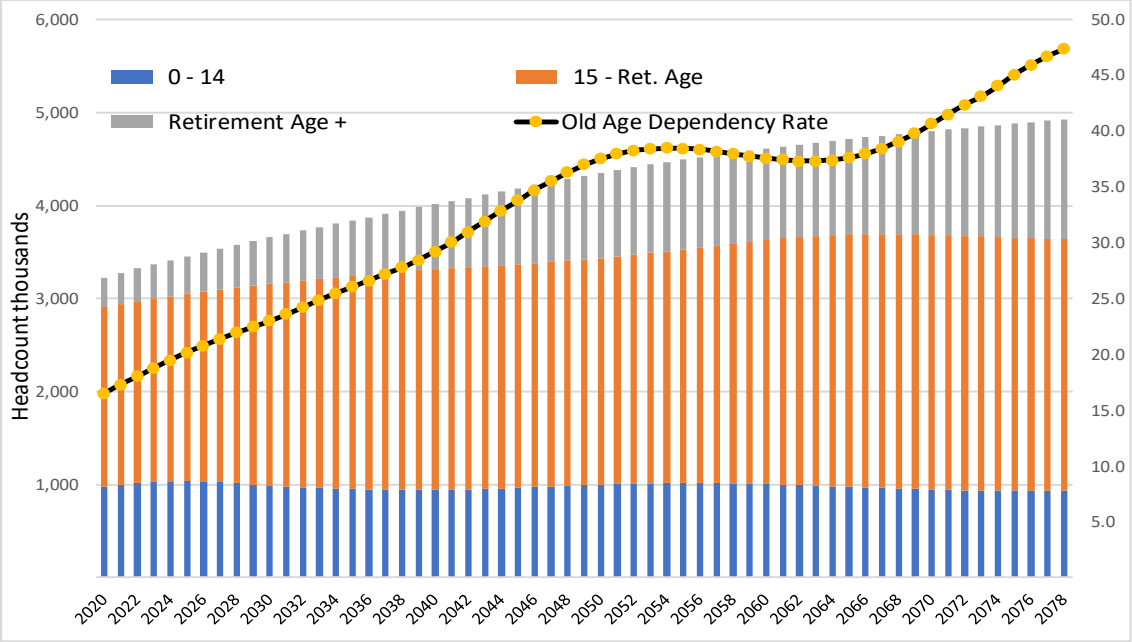
III. Demographics

The current and projected fertility rate increased substantially since the last evaluation in 2018. This is projected to have a positive effect on pension system finances, particularly after about 20 years when these individuals enter the labor force.

Mongolia's elderly population is growing much more rapidly than its working age population leading to rapid growth in the old-age dependency rate (Figure 1). The old-age dependency ratio is

projected to increase from about 16% in 2020 to 23% in 2030 and almost 38% by 2050. The fertility rate has increased in recent years in Mongolia leading to a flattening of the old-age dependency ratio when these individuals retire. This aging process has profound consequences for pensions in Mongolia. With each contributor supporting more and more workers, there are generally only three options—increase contributions, reduce benefits or have people work longer, or some combination of these.

Figure 1: Projected Age Distribution and Old Age Dependency Rate



Source: World Population Projections, 2019 revision.

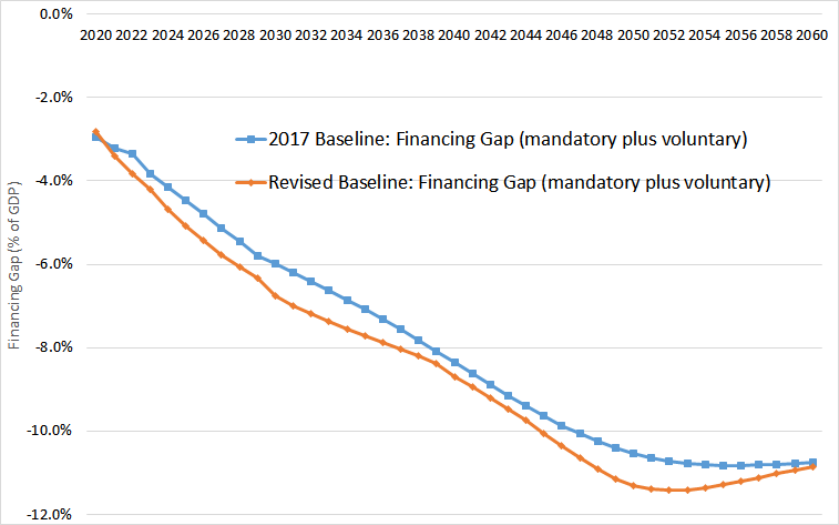
IV. Pension Insurance Fund

Baseline projections suggest a rapid and unsustainable level of growth in the required State Subsidy for the Pension Insurance Scheme (Figure 2).[6] It is estimated that the state subsidy will rise from about 2.8% of GDP in 2020 to 6.8% of GDP in 2030 and 11.3% of GDP in 2050. This is a somewhat more adverse scenario than was projected in 2018 (based on 2017 data). If we assume that fiscal revenues as a share of GDP remain stable at about 30.4% of GDP, this suggests that state subsidies to pensions will grow from 9.2% of total revenues and grants in 2019 to 37% by 2050, crowding out other essential public expenditures. If growth exceeds expectations, so too will wages and pension obligations.

The projections suggest somewhat larger required levels of a State Subsidy when compared with the 2017 projections (Figure 2). Changes are attributable to several factors including: (i) revised data on fertility rates since 2012; (ii) reductions in herders' retirement ages reflected in the retiree data; (iii) revised assumptions on real wage growth and coverage; and (iv) since 2011, substantial real ad hoc increases in the minimum pension (See Section VI).

[6] This is based on PROST projections undertaken in December 2019 based on data at end-year 2018. The previous projections were done in 2018 based on data at end-2017.

Figure 2: Baseline Financing Gap – 2017 and 2019
(% of GDP)

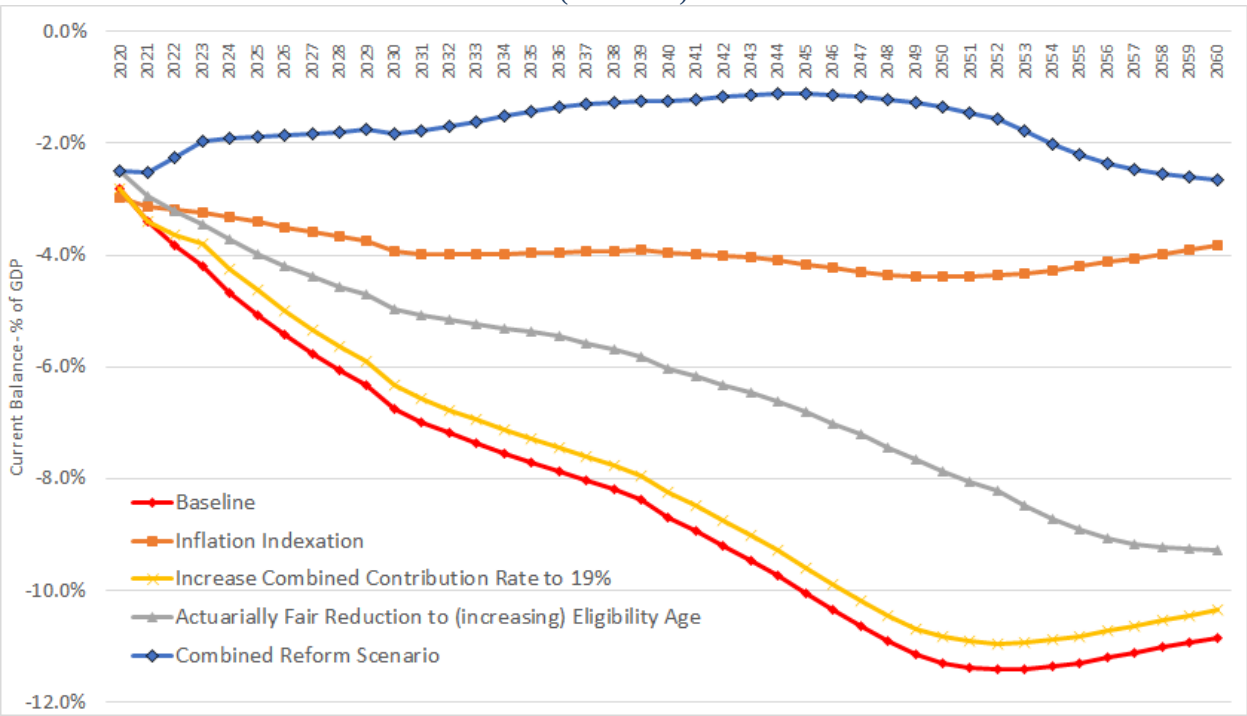


Source: PROST Projections in 2018 and 2020.

We recommend several reforms to pension parameters which have been modeled to project the effect on the required State Subsidy (Figure 3). These reforms would reduce the growth of public expenditures while also making the pensions system more equitable and benefits more predictable.

At the same time, there is a tradeoff for some reforms between improving sustainability on the one hand and reducing the replacement rate (or pension adequacy) on the other (Figure 4, Figure 5). The projected baseline suggests that the average benefits as a percent of average covered wages will increase from about 55% in 2020 to about 62% in 2030 in the mandatory scheme. For the voluntary scheme, the replacement rates tend to be higher, mainly because the minimum pension after 2012 was increased to well above the minimum wage and the projections assume that the minimum will increase commensurate with wage growth. Scenarios using price-based indexation suggest that the replacement of the average covered wage will decline in both the mandatory and voluntary schemes as prices are assumed to grow less than wages.

Figure 3: Baseline and Reform Options Financing Gap
(% of GDP)



Source: PROST Projections, 2019.

Notes: The baseline assumes that growth in the minimum pension and the total individual pension are both indexed to growth in the average covered wage. The output was so close to the baseline that we have not shown this scenario in the figure. It is however reflected in the combined reform scenario.

***Inflation indexation** – The inflation indexation scenario assumes that the indexation for both the minimum pension and the regular pension amount is adjusted by the growth in the consumer price index of the previous year.*

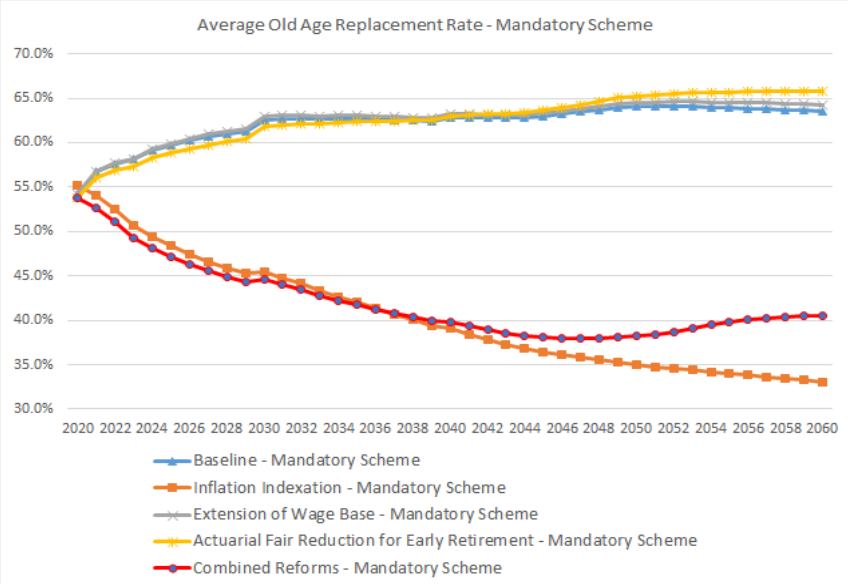
***Wage base extension –** Assumes that the wage base for calculating pensions increases over time from 7 years to 30 years at a pace of 1 year per year of increase, and the indexation or "valorization" of the wage base according to the growth in covered wages.*

***Actuarially fair benefit reduction for early retirement -** Assumes an actuarially fair penalty applied to the retirement benefit for those retirees retiring prior to the prevailing retirement eligibility age and an actuarially fair supplement applied to those retiring after the eligibility age. Also assumes that the retirement eligibility age would increase at a rate of 3 months per year until, after 20 years the age for men reaches 65 and for women after 40 years.*

***Increase in the payroll contribution rate**. This reform scenario would increase the contribution rate by 2.0% for the mandatory scheme (from a total of 17.0% to 19.0%) over a period of 2 years beginning in 2022. It would similarly increase the contribution rate by 2.0% for the voluntary scheme (from a total of 12.0% to 14.0%) over the same period.*

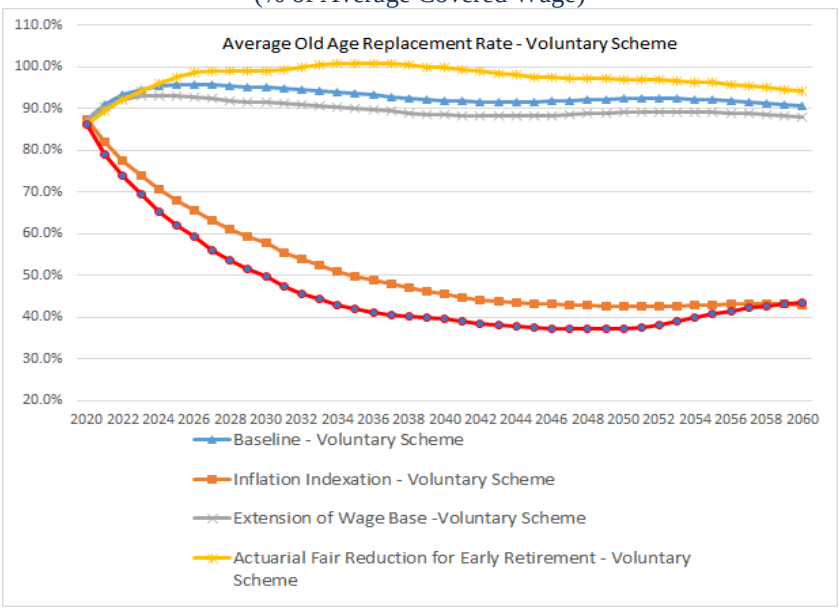
***Combined reform scenario**. This reform scenario would enact all of the four reforms above, according to the same parameters and transition periods.*

Figure 4: Replacement Rates – Mandatory Scheme
(% of Average Covered Wage)



Source: PROST projections.

Figure 5: Replacement Rates – Voluntary Scheme
(% of Average Covered Wage)



Source: PROST projections.

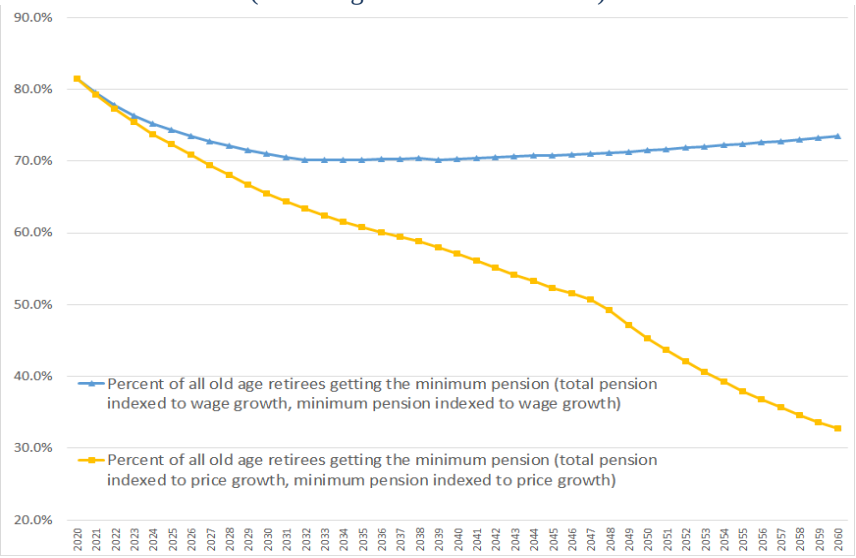
The following parametric reforms are suggested and have been modeled:

- **Indexation**. It is suggested to adopt a policy of automatic indexation for pension benefits which is calculated as the growth in the consumer price index. In addition, the minimum pension should be indexed to the CPI and eventually be replaced by a non-contributory Tested Social Pension (TSP). This would automatically protect retirees from the effects of inflation during retirement with annual benefit increases. This one parametric change is projected to stabilize the fiscal costs at about 4.0% of GDP by 2030. The trade-off with this approach is that inflation-based indexation gradually reduces the benefit relative to the average covered wage because, on average, wages grow faster than prices

(Figure 4, Figure 5). However, it is important to note that the replacement rate of the average covered wage would gradually reduce through the course of an individual's retirement.

Most of Mongolia's retirees receive the minimum pension so that the indexation method chosen has an important effect on the proportion of retirees receiving the minimum pension (Figure 6).[7] With more than 80% of retirees receiving the minimum pension, this suggests the importance of changes in the minimum pension as discussed below. In addition, adoption of price-indexation for both the total pension and the partial- and full minimum pension would have the effect over time of materially reducing the proportion of total retirees receiving the minimum (Figure 6).

Figure 6: Percent of Retirees Receiving a Minimum Pension
(according to indexation method)



Source: PROST projections.

- **Wage base extension and valorization**. The wage base for calculating pensions should gradually be increased from the current 7 years to a worker's lifetime wages and the wage base indexed or "valorized" according to the average growth in covered wages.[8] The rationale behind this reform is to improve the incentives, the equity between workers and reduce the tendency for some workers to materially increase their wages 7 years before retirement.[9] Although we cannot model a behavioral response to the proposed policy change, increasing the wage base over time from 7 years to 30 years at a pace of 1 year per year of increase was projected to have an immaterial impact on reducing costs. This policy change alone would also have an insignificant impact on replacement rates.

[7] In the period from 1994 to 2011, the proportion of retirees receiving the Minimum fluctuated substantially. Key reasons were wage compression prior to 1994 and difficulties in determining wage histories before 1994. In 2011 and subsequent years, other factors contributed to the sharp increase in the proportion receiving the minimum. These were: (i) substantial real increases in the minimum pension which pushed it up from about 75% of the minimum wage in 2011 to about 140% in 2017; and (ii) a service buyback program implemented in 2014 which provided service credit for work between 1991 and 2000 at an insignificant cost effectively ensuring that anyone over retirement age or approaching it would get at least a Partial Minimum Pension which has a vesting requirement of 10 years.

[8] This could be increased at a rate of one year's increase per year so that the scheme would include 30 years of wages in 23 years.

[9] This was found by a substantial of workers in both mandatory and voluntary schemes. However, it was most significant in the voluntary scheme where workers generally reported minimum wages until 5-7 years before retirement when the reference wage increased substantially.

- **Actuarially fair benefit reduction for early retirement**. Mongolia has one of the lowest retirement ages in the region and provisions for 5-10 years early retirement even below the already very low retirement ages.[10] The proposed policy would include: (i) An actuarially fair penalty applied to the retirement benefit for those retirees retiring prior to the prevailing retirement eligibility age and an actuarially fair supplement for those retiring after the eligibility age; (ii) the retirement benefit eligibility age would increase at a rate of 3 months per year until it reaches age 65 (after 20 years for men and 40 years for women); and (iii) early retirement provisions for Mother Heroes and special professions should also phase out at a rate of 3 months per year of early retirement. Linking the eligibility age to life expectancy at such age could also be considered.

- **Increase in the payroll contribution rate**. This reform scenario would increase the contribution rate by 2.0% for the mandatory scheme (from a total of 17.0% to 19.0%) over a period of 2 years possibly beginning in 2022.[11] It would similarly increase the contribution rate by 2.0% for the voluntary scheme (from a total of 12.0% to 14.0%) over the same period.[12] The proposed increase of the contribution rate is projected to realize about 1.0% of GDP fiscal cost savings per year over the projection period.

- **Combined reform scenario**. This reform scenario would enact all of the four reforms above, according to the same parameters and transition periods. The combined reforms are projected to reduce the required state subsidy to under 2.0% of GDP by 2023 and keep the costs down through 2050.

Weaknesses in the vesting provisions and minimum pension also need reform (See Section VI). Provisions for the partial minimum pension and a full minimum pension need to be simplified. As discussed below, we suggest replacement of these minimums with a Tested Social Pension and the removal of vesting requirements to receive the minimum.

V. Notional Defined Contribution Scheme

The Notional Defined Contribution (NDC) scheme suffers from multiple weaknesses in design and implementation as follows:

- The design parameters apply the NDC scheme to all cohorts born after 1979 with no transition mechanism established between cohorts. This results in an abrupt reduction in the anticipated replacement rate for most new retirees when compared to those born in 1978. This is not only inequitable, it is socially infeasible.
- The abrupt decline in the replacement rate under the NDC scheme will greatly increase the proportion of retirees who would be entitled to the minimum pension. This reduces the linkages between contributions and benefits thereby weakening incentives.
- The design has not set out earmarking of contributions or segregated the risks for disability and survivorship from the notional pool for old-age benefits.

[10] The retirement age is 55 for women and 60 for men. Herders meeting specified criteria can retire 5 years early. Workers in hazardous professions and working in "high heat" can also retire early. Women with 4 or more children can retire and a majority of women retirees have been able to meet these criteria. Other special professions have distinct early retirement provisions.

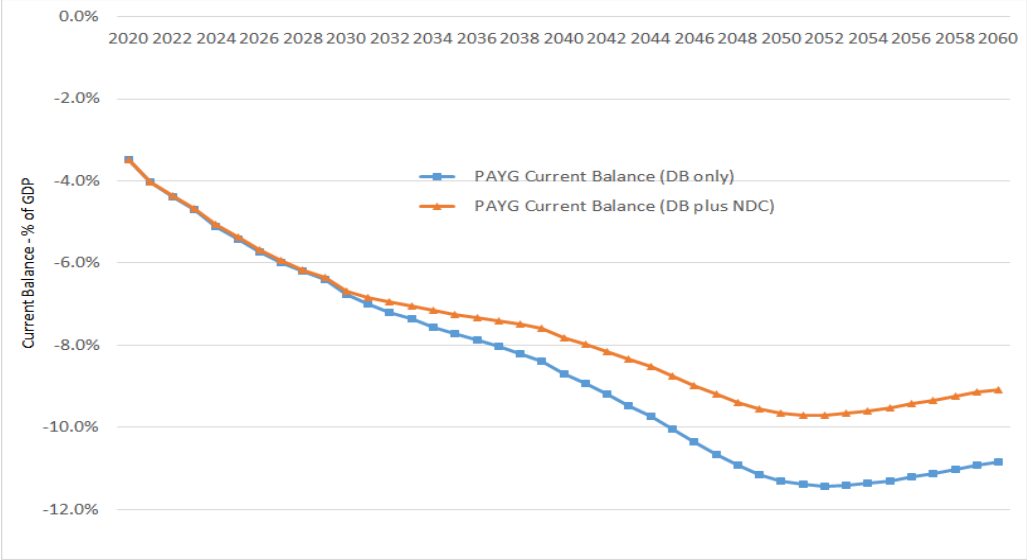
[11] The increase from 17% to 19% should only begin once Mongolia's economy has stabilized. An increase in the pension contribution rate was planned and legislated to take place in 2020 (by 1% and 1% for employers and employees respectively) and has been postponed to 2021.

[12] This is the same parametric change which was legislated in early 2017 and rescinded in 2019 from going into effect in 2020.

- The amendment in 1999 creates confusion between the objectives of the NDC scheme and the aspirational goal of transitioning to a Funded Defined Contribution Scheme.[13] There has been and continues to be widespread confusion over the very nature of an FDC scheme.
- There have been technical problems in the calculation of the notional interest rate and there were difficulties in calculating the starting notional balance, particularly for those with work histories prior to 2004. Both of these factors have understated notional account balances and therefore the benefits under the NDC scheme.

The NDC scheme begins to realize cost savings when those cohorts born in 1979 begin to retire in about 2030 (Figure 7). The fiscal cost savings is realized because of the sharp drop in replacement rates for retirees born after 1979 (see below). By 2050, the cost savings is almost 2% of GDP.

Figure 7: Impact on Current Balance - PAYG DB and NDC Schemes
(% of GDP)

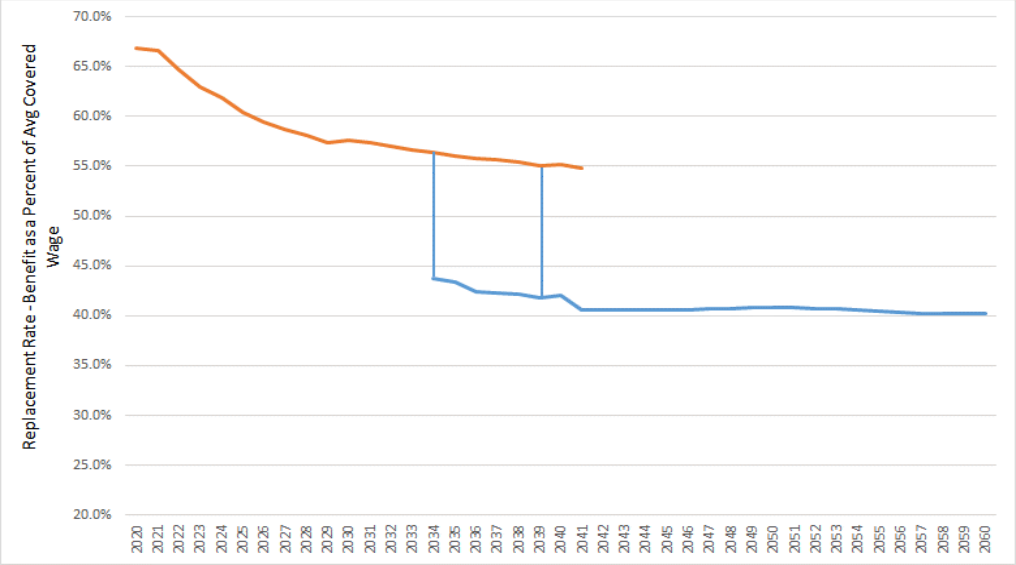


Source: PROST Projections, 2019.

The benefit, when measured as a proportion of covered wages, is estimated to decrease from about 55-57% under the current DB scheme to about 42-43% under the NDC scheme between 2030 and 2040 when most affected cohorts would retire (Figure 8). In about 2034 women born in 1979 would reach retirement age and in 2039, men would reach retirement age.

[13] The text of the amendment specifies that the NDC design is based on pay-as-you-go financing whereby contributions are used to pay current benefits and, in addition, a substantial State Subsidy is needed to address the shortfall between contributions and benefits. Notably, the benefit formula is defined in the amendment and is not in any way connected to the rate of return on reserves under management.

Figure 8: Reduction in Replacement Rates between PAYG DB and NDC Schemes
(% of Average Covered Wage)



Source: PROST Projections, 2019.
Note: The vertical lines are the projected drops in the replacement rates for men and women respectively. For purposes of presentation, we have eliminated the small number of pre-1979 cohorts retiring after 2042 and the small number of early retiree post-1979 cohorts retiring before 2032.

The severe drop in the projected replacement rate without a transition would create substantial inequity between cohorts and is therefore not advised. An abrupt reduction in the benefit between cohorts is highly inequitable and most countries adopt transition programs to smooth the effects between cohorts. In addition, since the minimum pension would remain the same between cohorts, some workers would find their benefits decreasing between cohorts while others (with the minimum) would be unaffected.

Virtually all of the beneficial features of the NDC scheme can be achieved through automatically parameters in the existing DB scheme which have automatic adjustments as outlined and recommended above. These should include:

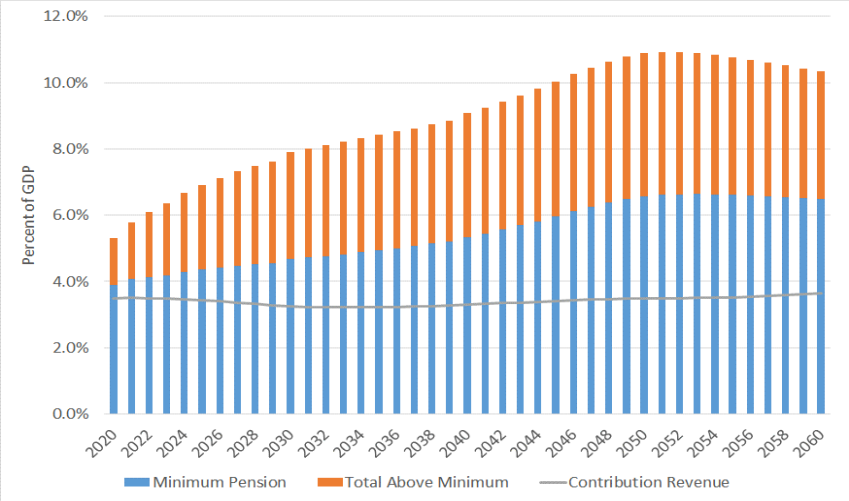
- Actuarially fair adjustments to benefits in the DB scheme according to the age of retirement by applying an actuarially fair discount/premium factor for early/late retirement.
- Setting the wage base as lifetime earnings and valorizing wages based on wage growth in the DB scheme precisely emulates the NDC scheme.
- Automatic indexation can be established in the DB scheme.
- The retirement eligibility age in the DB scheme can be linked to the life expectancy at retirement age also emulating the NDC design.

VI. Minimum Pensions and Social Pension

The rationale behind the minimum pensions is to ensure a minimum level of subsistence while creating incentives for workers to contribute to the Pension Insurance Scheme. The current contributory scheme provides a minimum pension for fully vested retirees with 20-25 years of qualifying service and a partial minimum pension for retirees with 10 years of qualifying service. In addition, retirees who do not qualify for a contributory pension can qualify for a non-contributory

Social Welfare Pension which is a much smaller benefit.[14] As indicated above, in 2018 about three quarters of retirees received the minimum pension (Figure 6). The minimum pension and partial minimum are also a majority of overall current and projected costs (Figure 9).

Figure 9: Costs for Minimum Pension and Total Pension
(% of GDP)



Source: PROST, 2019.

Substantial and abrupt ad-hoc increases in the minimum pension and partial pension since 2011 have materially affected the proportion of retirees receiving the minimum thereby weakening the links between contributions and benefits.[15] The minimum pension grew about 65% higher in real terms between 2011 and 2018 while the partial minimum pension grew 116% in real terms during the same period. These changes in benefits since 2011 also changed the relative level of benefits when compared with one another and with key wage and living standard indicators. For example, in 2011, the full minimum pension increased to over 128% of the minimum wage although the law specifies that when the level should be at least 75% of the minimum wage. The partial pension increased to over 100% of the minimum wage, when the law specifies that the level should be at least 50% of the minimum wage. For pension beneficiaries who earned the minimum wage prior to retirement, these minimum benefit levels were higher in retirement than the wages received while working. The ratio of the partial pension to the full minimum pension also increased substantially during this period increasing from 67% in 2011 to 83% in 2018. This suggests that a worker with 10 years of contributions receives a benefit that is 83% of the benefit they receive after contributing an additional 10 years to receive the full minimum pension.

The vesting rules and multiple minimum pensions creates highly fragmented incentives for labor participation and participation in the social insurance scheme. A high minimum pension combined with substantial changes in benefits at 10 and 20-25 years of services provides weak links between workers' contributions and benefits and therefore strong incentives for wage under-reporting as well as an incentive to stop working under a formal labor contract once the vesting requirements are met. In addition, neither the minimum pension or the existing Social Welfare Pension is automatically indexed which subjects retirees to considerable inflation risk.

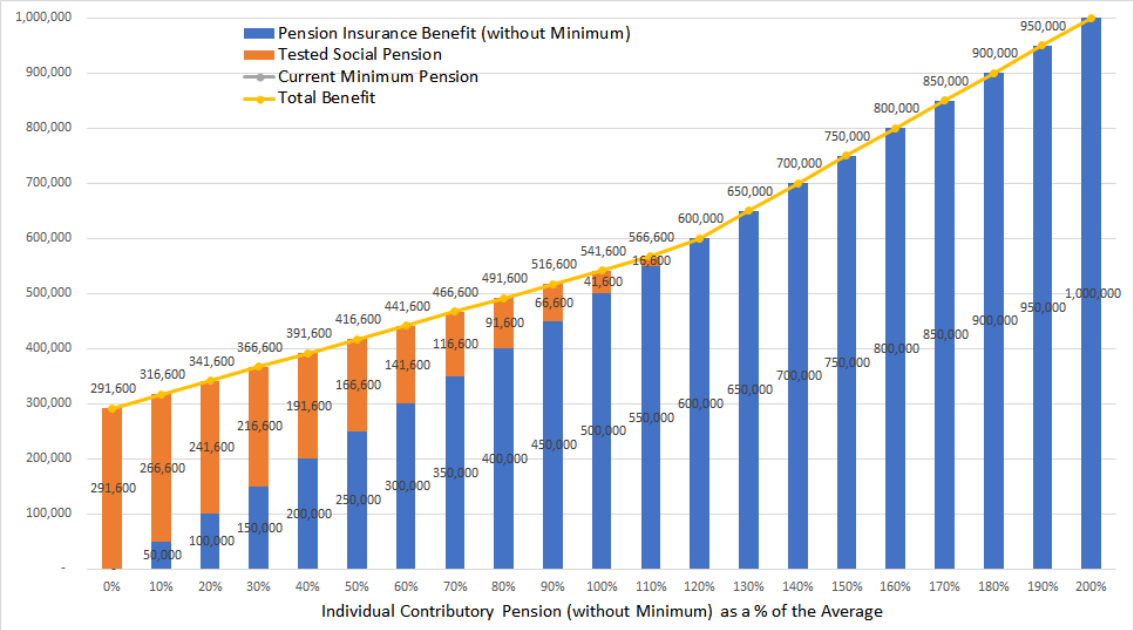
A recommended means of ensuring minimum elderly protection while still ensuring incentives to work and contribute to the pension system would be to establish a Tested Social Pension (TSP) with

[14] For a much more thorough analysis of the level of the minimum pension and partial minimum pension, see World Bank, 2018.
[15] Ibid.

a clawback feature and have it replace the Minimum Pension. The concept is that a TSP would be provided to every Mongolian citizen over an age to be specified (see below) regardless of their years of contributions to the pension system. Similarly, the vesting requirements for a pension would also be reduced to a level which justifies the transaction costs of processing a pension.[16] The TSP could, after a transition period, replace both the full minimum pension and the partial minimum pension.

The clawback parameters might be designed as follows: The TSP could be reduced (clawed back) by 50% of the pension amount up to the point when the pension is twice the amount of the TSP. For example, suppose that the TSP was 291,600 MNT (the same as the current partial pension) and the retiree's pension was 100,000 MNT. The individual would receive their 100,000 MNT pension in full plus the TSP (291.6k reduced by 50% of the pension amount (100k) or 50k for a total TSP benefit of 241,600 MNT - Figure 10).

Figure 10. Stylized Illustration – Pension Insurance and Tested Social Pension



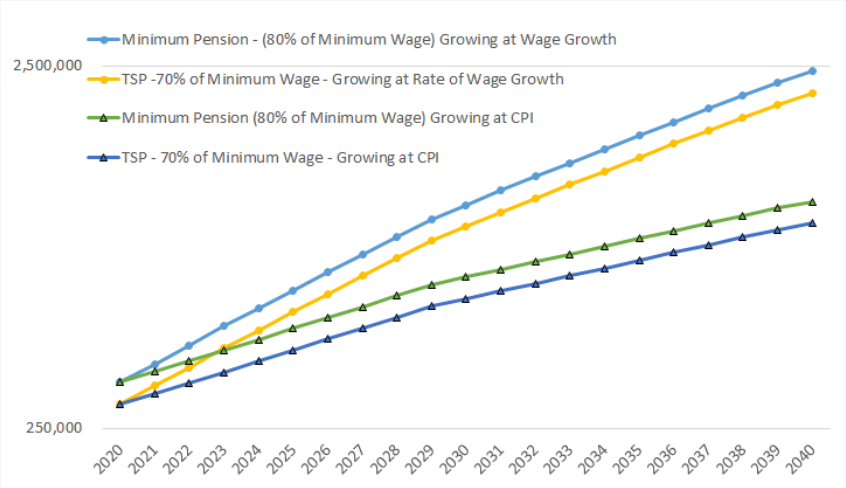
Source: Bank estimates.
Note: Assumes a Tested Social Pension benefit of 100% of the Partial Minimum Pension amount (291,600/month in 2020.

The indexation of benefits and the transition of the minimum pension to a TSP are closely related. At this writing, the full minimum pension was about 80% of the minimum wage slightly above the 75% proportion suggested in the 1994 law while the partial minimum was about 70%.[17] Although there are many options to consider, one rather seamless option would be:

- Replace the partial minimum pension with a TSP and set the benefit amount equal to the current benefit of the partial minimum – about 70% of the minimum wage.
- Leave the full minimum pension in place but ensure that the difference between the minimum and the TSP is relatively small and constant.
- Indexation of the TSP, the minimum pension and total pension benefits should all be consistent. Figure 11 illustrates the growth of the monthly benefit of the minimum pension and TSP under these assumed parameters for a 20 year period.

[16] For simplicity, this could align with the vesting requirements for disability and survivorship benefits.
[17] In 2020, the monthly full minimum pension was 334,800 MNT per month, the minimum wage is 420,000 per month, and 75% of the minimum wage would be 315,000 per month.

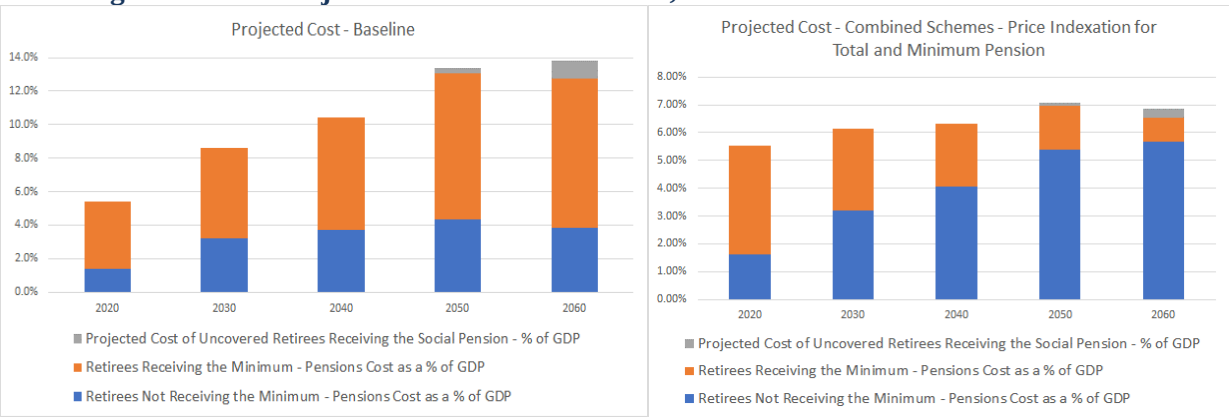
Figure 11. Growth of Minimum Pension and Tested Social Pension
(assuming indexation according to wage growth and CPI growth, respectively)



Source: Bank estimates.

The fiscal impact of either replacing the partial minimum pension or full minimum pension with the TSP would be negligible under the assumption that elderly coverage continues to make Pension Insurance largely universal.[18] It is possible, however, that some will not qualify for pensions in the years ahead, particularly if we assume that no service buyback arrangements are established in the future.[19] The estimates in Figure 12 below assume that the age and coverage profile is only moderately affected over the long-term. As discussed above, the total costs are substantially lowered if total pensions, the minimum pension and the TSP are all indexed to inflation.

Figure 12. Projected Fiscal Costs Pensions, Minimum and a Tested Social Pension



Source: Bank estimates using the PROST model.
Note: Current balance as a percent of current year projected GDP.

[18] The data from 2018 suggests that the ratio of retirees covered by pension insurance was over 100% of those individuals above retirement age. The main reason for such extraordinarily high coverage is the 2014 service buyback program substantially increased the number of workers and retirees eligible to receive a pension. The 2020 service buyback program is expected to further extend this high coverage. It is also possible for individuals to qualify for a partial minimum pension by contributing to the voluntary pension scheme for 10 years and only making contributions of 12.5% of the minimum wage to qualify. In addition, the Mongolian pension scheme has a substantial number of early retirees such as those in qualifying professions or Mother Heroes. This increases the number of pension recipients to a level over the number of those over the retirement ages of 55 for women and 60 for men.

[19] Contributors at end-2018 represented about 78% of the estimated labor force size. Individuals who do not qualify for a pension are entitled to a non-contributory *Social Welfare Pension*.

VII. Evaluation of a Funded Defined-Contribution Scheme (FDC)

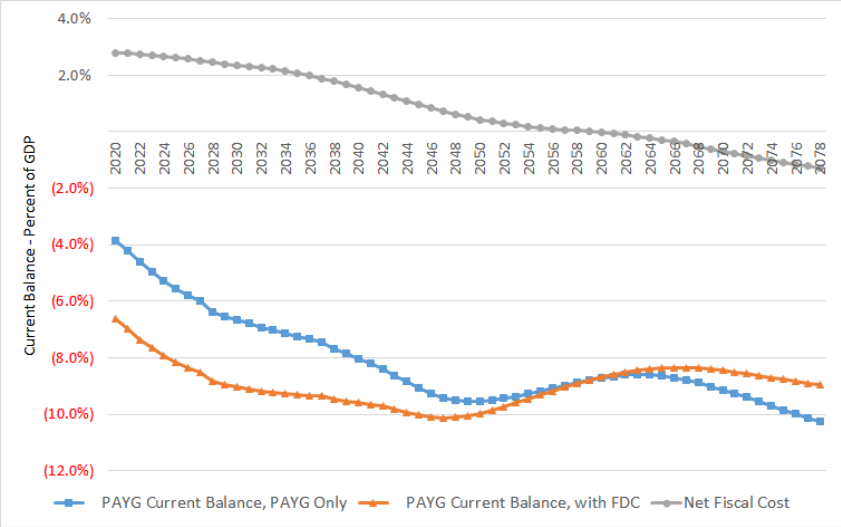
There have been many proposals to replace Mongolia's PAYG DB scheme with a Funded Defined Contribution (FDC) scheme. An FDC scheme is a retirement savings scheme whereby contributions go into a fund which accumulates until retirement. The funds are invested in securities either by a single agency or by fund managers appointed by employers or employees. The retiree receives either (a) an annuity which is calculated based on the individual's balance at retirement, the life expectancy at the age of retirement and the prevailing interest rates; (b) a phased-withdrawal whereby the retiree can draw a portion of the balance based on his or her age and life expectancy; or (c) some combination of both. Some provident schemes also provide for part or all of benefits in the form of a lump-sum though this is not advised.

Although there have been many variants discussed of an FDC scheme in Mongolia, in principle all of funds contributed and accumulated in a Pension Fund set aside to back up the future benefits of members. Individuals bear the risk and receive the return on pension fund assets during the accumulation phase (net of management and administrative costs). Some countries have centralized data and/or fund management and some countries have decentralized fund management. Some countries have workers choose fund managers while others have the employer make such a choice. There are several different design arrangements for the payout phase so that investment risks, longevity risks, inflation risks and liquidity risks may be the responsibility of the sponsor, management agency, employer, employee or some combination thereof. If an annuity contract is purchased by the beneficiary, then the insurance company selling the contract bears most of the risks.

An FDC scheme will provide an individual replacement rate which is <u>lower</u> than under an equivalent PAYG DB scheme if the real rate of return on pension assets (after management and administrative costs) is lower than the real rate of growth of covered wages. This is important to consider because the workers' benefit could be substantially lower and inadequate under such a design unless it is possible to have a real return in excess of wage growth over the long-term. Countries with thin and poorly developed financial markets often find it difficult to achieve such real rates of return by investing domestically and may not have in place the macroeconomic management capacity to place substantial portions of pension assets in investments abroad. It has been challenging to minimize administrative costs in many countries, particularly with concentration of fund managers and a decentralized design which requires high fixed investment costs.

***An FDC scheme will substantially increase the fiscal costs (the required State Subsidy) for about 20 years depending upon parameters and market returns*.** When a country moves from an unfunded scheme, as is the case in Mongolia, to a Fully Funded (FDC) scheme, all new contributions and investment returns need to be placed in a fund and current contributions cannot be used to finance the pension benefits of current retirees as is currently the case under Mongolia's PAYG scheme and under Mongolia's NDC scheme. Projections of an FDC scheme in Mongolia suggest that after a period of over two decades, the FDC scheme begins to finance pensions from reserves and therefore the burden of financing pensions shifts from the state to the individual.(Figure 13) With current contributions diverted to accumulate reserves in a separate fund, the Government then has to substantially increase its State Subsidy to ensure that current retirees receive all the benefits they have been processed. This net increase in the State Subsidy continues for many years until such time as the payouts to retirees from the individual accounts begins to substantially reduce the pension benefit costs to the Government.

Figure 13. Projected Fiscal Costs of Funded Defined Contribution Scheme
(% of GDP)



Source: PROST projections.
Note: This assumes the adoption of an FDC scheme in 2019. It assumes a 17% combined contribution rate. The real rate of return assumptions are outlined in the appendix.

The Government will need a means of financing the substantial additional fiscal transition costs and may likely need to increase public debt burden. Issuance of additional treasury securities which can impact its cost of borrowing and its debt sustainability metrics. In addition, if the authorities monetize the accumulated rights through Government-guaranteed service recognition bonds, this converts implicit obligations or promises to explicit obligations and adds to the stock of government debt.

Various transition arrangements which will impact the fiscal costs and retirees' risks. These include the age of the worker who is placed into the FDC scheme or the range of ages during which movement to the FDC is optional. There are various transition options for translating accumulated entitlements in the PAYG DB scheme into cash balances in the FDC scheme. Some countries have quantified the equivalent balance for contributory service up to the reform date and then established recognition bonds payable at retirement to finance these balances while others have provided two pensions to eligible retirees – the PAYG DB pension and the FDC pension.

***Several of the countries which have converted from PAYG DB schemes to either FDC or hybrid schemes have since modified the FDC pillar or have reverted entirely to a PAYG DB scheme*.** The first country to convert to an FDC scheme was Chile in 1981 and it was followed by many countries in Latin America in the 1990s and early 2000s. In Eastern Europe and Central Asia, most countries adopted a "hybrid" approach whereby they converted part of the existing PAYG DB scheme to an FDC scheme while leaving part of the pension formula through the existing or reformed scheme. Additional developing countries established FDC pillars in the 2000s. During and after the global recession of 2007-2011, several countries had full or partial reversals of their FDC schemes and others substantially modified the rules. Notably, Hungary and Argentina closed their FDC schemes, Poland has largely removed the Funded pillar, and seven countries in Central and Eastern Europe have made substantial changes to their FDC schemes.

Several necessary enabling conditions are needed to be in place to establish an FDC scheme:

- There needs to be sufficient ***macroeconomic stability and sound fiscal management***.

- There needs to be sufficient ***breadth and depth of buyers and sellers in each of the financial product markets*** in which the pension funds invests. In those cases where there are shallow financial markets as is the case in Mongolia, the effective default is for funds to be invested in Treasury securities. This drives up the size of the Government debt (essentially replacing implicit debt with explicit debt). It also uses contributors' funds to finance the management costs which ultimately reduce the size of their pensions.
- There needs to be ***strong regulation and supervision both of pension fund managers and of the financial markets*** for pension fund investments. Pension regulations often limit the risks the investment classes of pension fund investments. If insurance companies are to be involved in the payout phase, these institutions have to be subject to even stronger safety and soundness requirements than through voluntary insurance instruments.
- ***Financial management, investment management and information systems infrastructure need to be in place*** to support the FDC design. This includes accounting and financial control systems, risk management systems, financial reporting, securities clearing and settlement and communications systems.
- ***The design has to ensure low management and administrative costs***, which is a particular challenge in a country like Mongolia where the fixed costs of management are high and the number of potential licensed funds managers is low.

An FDC scheme could potentially offer higher pensions over the long-run, but achieving this requires a long-term fiscal commitment to paying for transition costs. It also transfers political risks under a PAYG DB scheme of the Government partially reneging on its pension commitment to a performance risk shouldered by the worker which can affect the adequacy of benefits.

The risks of establishing an FDC scheme substantially outweigh the benefits in Mongolia so this policy option is not recommended. The required fiscal costs are substantial while the benefits are highly uncertain. In addition, substantial investments in regulation, supervision, and information infrastructure are needed before such a scheme could function befitting of the public trust.

Many of the benefits of an FDC scheme can be achieved through the parametric reforms to the PAYG DB scheme we have recommended without requiring additional fiscal costs or subjecting workers to the same level of risk. For example, establishing automatic valorization of the wage base creates and adjuster through the course of an individual's worklife. Actuarially fair adjustments to benefits according to the life expectancy at the retirement age also emulates the calculation of an annuity under an FDC plan.

VIII. Conclusion

This report has recommended parametric reforms to the Pension Insurance Scheme and used PROST modeling to project the impact on the State Subsidy and on retirees' replacement rates. Enactment of automatic price indexation of pensions and extension of the wage base for pensions will improve sustainability, incentives and predictability of benefits. Enacting a penalty for early withdrawal of pensions is also advised.

The Notional Defined Contribution scheme was found to be ill-suited for Mongolia's needs. Parametric reforms could achieve most of the same results without abrupt reductions in replacement rates between cohorts.

Adoption of a Tested Social Pension to replace the current minimum pension would ensure that all Mongolian retirees have a minimum level of old age income protection. It would also address current vesting rules which provide inconsistent incentives for workers.

A Funded Scheme is neither advisable nor feasible in Mongolia. A funded scheme would require a commitment to additional fiscal resources for three decades. Moreover, Mongolia does not have the regulatory infrastructure or financial markets to support such a scheme. Many of the benefits of an FDC scheme can be achieved through the parametric reforms to the PAYG DB scheme we have recommended without requiring additional fiscal costs or subjecting workers to the same level of risk.

Appendix 1: Actuarial Projection Methodology and Sensitivity Analysis

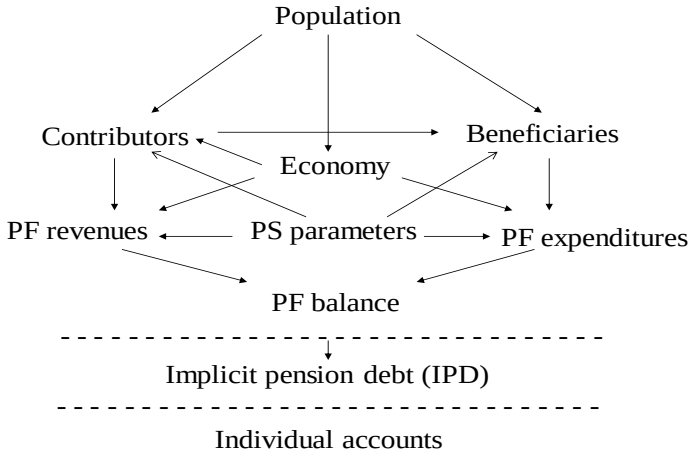
Mongolia has a single contributory national pension scheme for its entire labor force. All workers with formal labor contracts are required to contribute to the mandatory scheme. Workers without formal labor contracts can contribute to the voluntary scheme. All government workers, armed forces personnel and contracted private sector workers are covered by the system on a mandatory basis. The benefits to the formal workers and voluntary participants are the same.

The scheme segregates the labor force into three cohorts: those born prior to 1960 (pre-1960 cohorts), those born between 1960 and 1978, and those born in 1979 or later. The benefits available under current law depend on the cohort group of the worker. Those in the pre-1960 cohort are eligible for DB pension benefits, the main parameters of which are outlined below. Those in the 1960-1978 cohort have notional account balances and are eligible for the better of the pension benefits calculated based on the NDC formula or the benefit from the DB pension formula. According to the *State Policy on Pension Reform, 2015*, cohorts born after 1978 will have their benefit calculated only based on the NDC pension benefit formula.

The financial projections of the pension system were made using the Pension Reform Options Simulation Toolkit (PROST) an Excel-based software developed by the World Bank and licensed to country client users. The Toolkit has been enhanced over the years since its creation and the version used for this analysis is *PROST 2015*. The Toolkit follows the methodology depicted in Figure 14**Error! Reference source not found.** for carrying out the projections and arriving at the inflows and outflows of a pension system. Previous PROST projections were undertaken in 2011, 2013 and 2017.

The base year for the analysis is 2018. The simulation period runs from 2018 to 2093 though for presentational purposes, we have only included projections in the report through 2060.

Figure 14. PROST Projection Methodology

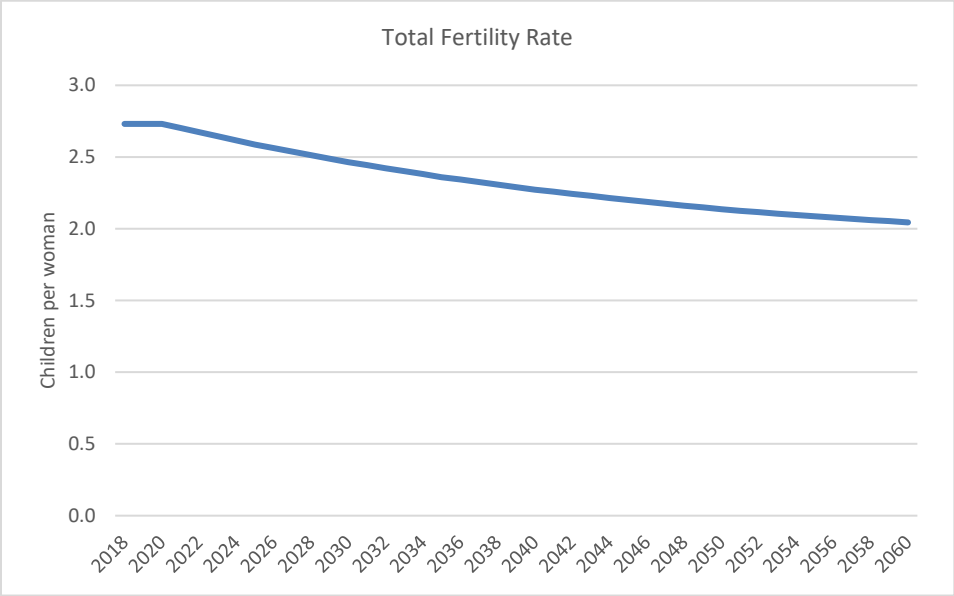


Demographic Projections and Economic Assumptions

UN population data and projections for Mongolia were used in the simulations.[20] Fertility assumptions in the model are based on the total fertility rates indicated in the UN data (see Figure 15). This represents a change in the fertility assumptions since the last report.

[20] See United Nations, 2019. World Population Prospects 2019, Online Edition. Rev. 1.

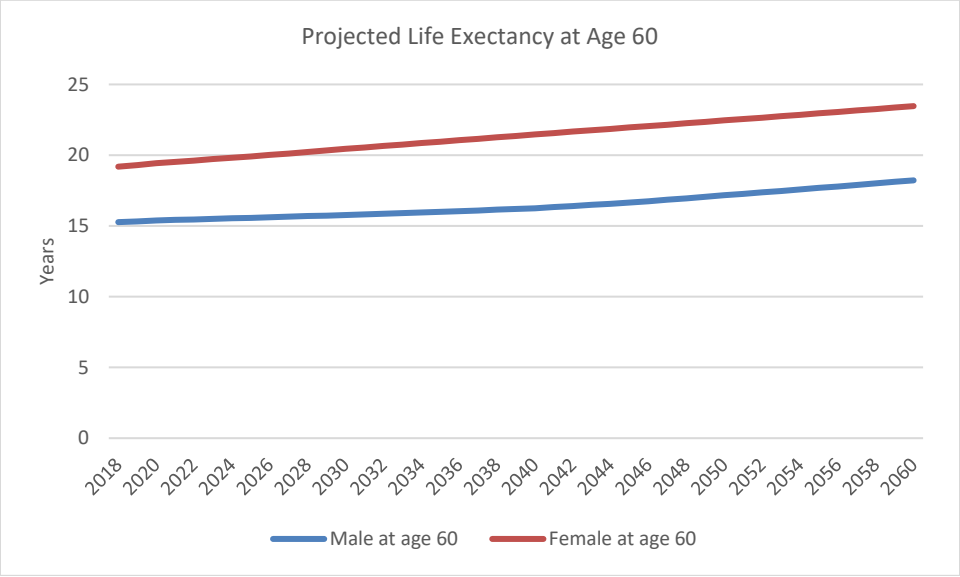
Figure 15. Projected Fertility Rates
(children per woman)



Source: World Population Prospects, 2019, based on Mongolian census information.

UN population data on mortality for the population was used in the simulations.[21] This results in life expectancy at age 60 of about 15 years for men and 19 years for women, and these are projected to increase over time. (see Figure 16).

Figure 16. Projected Life Expectancy
(years at age 60)



The key macro assumptions in the modeling are as follows:

[21] See United Nations, 2019. World Population Prospects 2019, Online Edition. Rev. 1.

Table 2: Assumptions for Real GDP Growth, Real Wage Growth and Inflation

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2035	2040	2045	2050	2055	2060	2080
Real GDP growth	6.90%	6.50%	5.40%	5.10%	5.60%	6.00%	5.00%	5.00%	4.90%	4.80%	4.70%	4.60%	4.50%	4.00%	3.50%	3.00%	2.67%	2.33%	2.00%	2.00%
Real Wage Growth	6.35%	7.80%	6.95%	5.14%	5.06%	5.19%	4.16%	3.83%	3.51%	3.21%	2.94%	2.72%	2.87%	2.72%	3.23%	3.13%	2.53%	2.06%	1.96%	2.06%
Inflation Rate	9.70%	8.40%	8.10%	7.00%	6.90%	7.10%	7.20%	7.20%	7.20%	7.20%	7.20%	7.20%	5.00%	5.00%	4.00%	3.60%	2.00%	2.00%	2.00%	2.00%

The GDP growth rate in the short- to medium-term is taken from the IMF debt sustainability analysis (DSA) produced by the IMF Article IV report.[22] This analysis covered the period 2018 to 2024 and took into account all macro-economic factors though it pre-dates the Covid-19 crisis. The real GDP growth assumption has been set in line with the estimates in the DSA. The GDP growth rate is assumed to decline from 5% in 2025 to 2% in 2060 and stay at 2% through 2080.

Wages are assumed grow both as overall salaries increase and as individuals are promoted through a salary scale. Real wage growth is strongly correlated with real GDP Growth. Over long periods, generally real wage growth is reflected in growth in real wages.

Although inflation is difficult to predict and volatile, the inflation assumption of course is important for indexation.

Pension System Contributors - The projected number of contributors is driven by the profile of workers at end-2018 (administrative data provided to the World Bank), assumptions of population growth and age composition as well as worker and retiree coverage assumptions. Sustained low fertility rates result in a stabilization of the working age population. The model assumes that the profile of contributors and the coverage of the working age population remains unchanged through the projection period.

PROST uses the flow of workers, wages and accrued benefits to project different categories of beneficiaries. In the baseline scenario the existing retirement pattern with respect to the age composition of new old age and invalidity pensioners was assumed to remain the same throughout the projection period. Survivors were assumed to change proportionately to changes in the population in respective age and gender cohorts.

With the projection of the population, labor force, employed, contributors and beneficiaries complete, PROST can determine the cash-flows of the pension system. For Mongolia, the mix of inflows are employer and employee contributions (including from the State as an employer), the State Subsidy, and investment income on the short-term reserves. pension system can have more than one source of in-flows: contributions from workers and employers, government contributions, investment income, etc.

The earnings profile by gender and age cohort as a multiple of minimum wage is also required PROST input. This profile was derived from the same SIGO contributors' database. The adjustment to workers with average wage below the national minimum was also made while determining the earnings profile. In accordance with the international trends, in Mongolia older ages tend to receive higher wages.

The contribution rate for employers and employees is defined in law as a percentage of covered wages. For 2018 the combined contribution rate was 16% for those covered under the mandatory scheme and 11.0% for the voluntary scheme. The combined contribution rate is assumed to increase to 17% for the mandatory scheme in 2019 and 11.5% in the voluntary scheme. Assumptions are also made about the compliance rate measuring the system ability to collect contributions. The compliance rate (or collection rate) used for the analysis is 90% throughout the projection horizon.

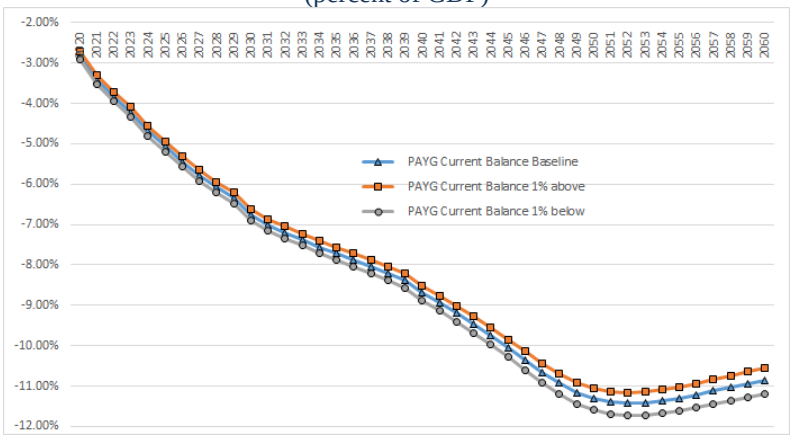
[22] See IMF Article IV for Mongolia, September 17, 2019, IMF Country Report No. 19/297.

Old-Age Pension Distributions - The following factors determine change in the average pension for old age pensioners: (i) the benefit formula for new pension calculations; (ii) the assumed pension indexation policy; and (iii) changes in the age composition of old age pensioners.

Sensitivity analysis

Sensitivity analysis was undertaken to clarify the impact of outcomes which deviate from key assumptions. Real GDP growth is a key assumption that was tested. The results are indicated below (Figure 17). Under the assumption that GDP is 1% lower than is assumed throughout the projection period results in an additional cost to the scheme of about 0.4% of GDP by 2050.

Figure 17. GDP Sensitivity Analysis
(percent of GDP)



Source: PROST projections.

Summary of Reform Scenarios

The table below summarizes the baseline and reform scenarios undertaken.

Table 3: Baseline and Reform Scenario Parameters

Reform Scenarios	Detail
Baseline	Projection of Baseline according to the benefit formula and qualifying conditions indicated in the laws of Mongolia. It is important to note that the projection assumes that the PAYG DB scheme will be applied to all cohorts, including those born on or after 1979.
(1) Indexation of pensions	Baseline + Price-based indexation for both the full minimum pension and the partial minimum pension.
(2) Wage base extension and valorization	Baseline + Assumed gradual increase in the length of the pensionable wage base from 7 years in 2018 to 30 years, at a rate of 1 year increase per year (extension from 7 to 30 years over a 23 year period). Assumption is that the wage base is indexed or "valorized" according to the growth in covered wages.
(3) Increase in the payroll contribution rate	Assumed increase in the combined employer/employee contribution rate by 2 percentage points – increasing to 19% for the mandatory scheme and 14% for voluntary scheme at a rate of 0.5 percentage points per year in 2022 and 2023.
(4) Actuarial reduction for early retirement	Actuarially fair reduction (increase) applied to individual retiring prior to (after) retirement age. Effective age for setting the reduction (increase) is assumed to increase at a rate of 3 months per year until it reaches age 65 (after 20 years for men and 40 years for women).
(5) Combined	Baseline + Scenarios 1-4.