An Assessment of the 2019 and 2020 Pension Reforms in Mexico

Boele Bonthuis

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Prepared by Boele Bonthuis

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ABSTRACT: In recent years the Mexican pension system has changed significantly. In 2019 the existing means-tested social pension was made universal – covering everyone over the age of 65 – and the benefit level increased. In 2020, the main regime of the private sector was substantially reformed, increasing contribution rates for the funded defined contribution system, lowering the minimum years of contributions needed to receive an earnings-related pension, and increasing minimum pensions. This paper tries to assess the likely outcomes of those reforms, discusses design inefficiencies of the reforms and offers policy options to improve pension system design.

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Author's E-Mail Address:	bbonthuis@imf.org

WORKING PAPERS

An assessment of the 2019 and 2020 pension reforms in Mexico

Prepared by Boele Bonthuis[1]

Contents

Glossary

AFORE	Administradora de Fondos para el Retiro (Pension Fund Manager)
DB	Defined benefits
DC	Defined contributions
CFE	Comisión Federal de Electricidad / state owned utility company
Coneval	Consejo Nacional de Evaluacion de la Politica de Desarrollo Social / Council for Evaluation of Social Development
GDP	Gross Domestic Product
ILO	International Labour Organization
IMSS	Instituto Mexicano del Seguro Social / Mexican Social Security Institute
ISSFAM	Instituto de Seguridad Social para las Fuerzas Armadas / Social Security Institute for Armed Forces
ISSSTE	Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado / Social Security Institute for State Workers
LAC	Latin America and the Caribbean
OECD	Organisation for Economic Co-operation and Development
PAYGO	Pay-as-you-go
PBPAM	Pensión para el Bienestar de las Personas Adultas Mayores / basic pension
PEMEX	Petroleos Mexicanos / state-owned petroleum company
PPAM	Pension para Adultos Mayores / social pension
PPP	Purchasing Power Parity
SHCP	Secretaría de Hacienda y Crédito Público / Ministry of Finance
UMA	Unidad de Medida y Actualización / indexation unit

I.   Introduction

In recent years the Mexican pension system has changed significantly. In 2019 the means-tested social pension was made universal and the benefit level increased. In 2020, it was decided to substantially reform the main regime of the private sector, increasing contribution rates and expanding eligibility to receive earnings-related and minimum pensions while raising benefit levels of the latter. This paper tries to assess the likely outcomes of those reforms, discusses design inefficiencies and offers policy options to improve pension system design.

The Mexican pension system is fragmented. Those in the formal economy have potentially accrued pension rights in multiple different schemes. Apart from the private sector scheme for entrants before 1997 (IMSS) and for entrants after 1997 (AFORE) there are separate schemes for civil servants (ISSSTE), workers at the state oil company (PEMEX), federal electricity commission (CFE), armed forces (ISSFAM) and abolished federal institutions (SHCP) in addition to separate schemes for universities, states and municipalities.[2]

The 1997 pension reform introduced large differences between those being allowed to retire under the old pay-as-you-go (PAYGO) rules and those retiring under the new rules. Anyone who has made a single contribution before 1997 can retire under the old PAYGO rules. The pre-1997 regime and the post-1997 regime were therefore projected to co-exist for a very long time. This chosen transition produced very different pension benefits for people with quite similar careers, with less generous pension benefits for post-1997 labor market entrants. The 2019 and 2020 reforms could be seen as an attempt to reduce some of these large differences, increase generosity and return, at least partially, to the pre-1997 system.[3]

Mexico's labor market is characterized by high informality. With 57 percent of employment in 2021 outside the formal sector,[4] many Mexicans accrue little to no earnings-related pension rights. Upon retirement those who spent their entire working life in the informal sector will have to rely on non-contributory pension benefits only, which historically were low compared to other OECD countries.

Pension coverage of the earnings-related pension system remains an issue. High informality and fragmentation of the pension system will almost inevitably lead to low coverage of earnings-related pension schemes and potential increased risk of old-age poverty. The ILO indeed estimates that in Mexico the active coverage – the number of active contributors as percent of the work force – was 41 percent, compared to 90 percent for high income countries, 71 percent for other upper-middle income countries and 47 percent for Latin America and the

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[2] While the fragmentation of the pension system is problematic, this paper focusses on the main regime for the private sector. For a comprehensive discussion on the fragmentation of the pension system see OECD (2016).

[3] Since the writing of this paper, the Mexican president has announced plans that could be interpreted as a more explicit return to benefits to the pre-1997 rules, promising pensions to workers "equal to their last salary". Details of these plans have not been made public and are therefore not discussed in this paper.

[4] Source: ILO, SDG indicator 8.3.1 - Proportion of informal employment in total employment.

Caribbean on average.[5] At most a third of each working age cohort contributed to the Mexican Social Security Institute (IMSS), the main social security institute in Mexico, in 2020 (Figure 1). On average only 23 percent of the working age population contributed to the IMSS.

Figure 1. Share of population contributing to the IMSS (percent, by age)
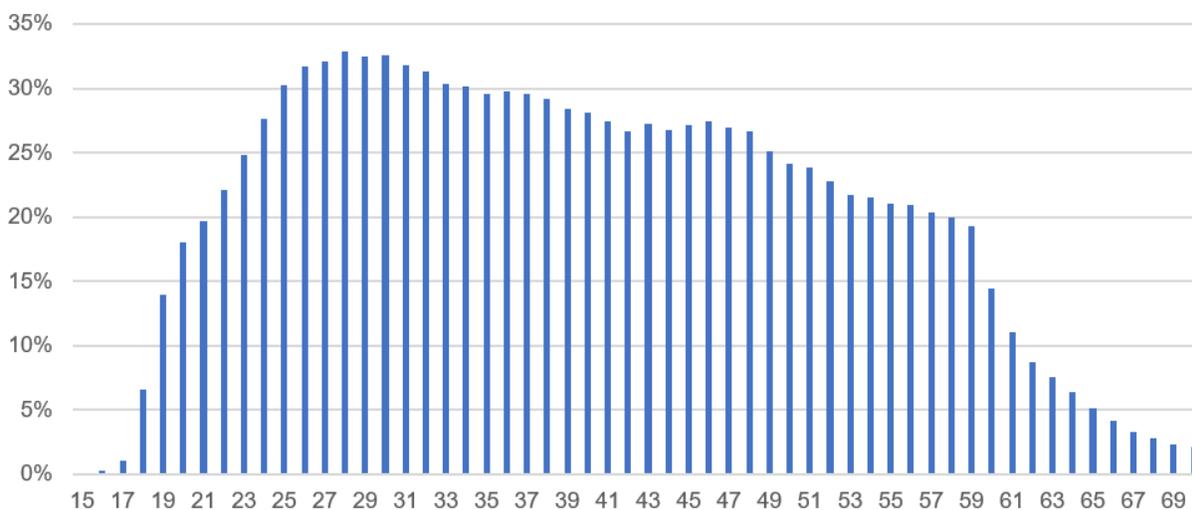
Source: author's calculations based on data provided by Secretaria de Hacienda.

Mexico currently has the youngest population of all OECD countries. In 2022 there were 12 people over the age of 65 for every 100 people of working age (15-64) (Figure 2). This old-age dependency ratio is roughly in line with the rest of Central America and the wider Latin America and Caribbean (LAC) region but much lower than other OECD countries (with an old-age dependency of 28). Mexico is also projected in the future to remain relatively young, roughly following the wider regional trend but with lower old-age dependency ratios than other OECD countries in the region like Colombia, Costa Rica and Chile.

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[5] Table A4.2 Social protection effective coverage (including SDG indicators 1.3.1 and 3.8.1), 2020 or latest available year (percentage of the relevant population group). Lower-middle income and low-income countries have a 27 and 7 percent active coverage rate respectively.

Figure 2. Old-age dependency ratios.
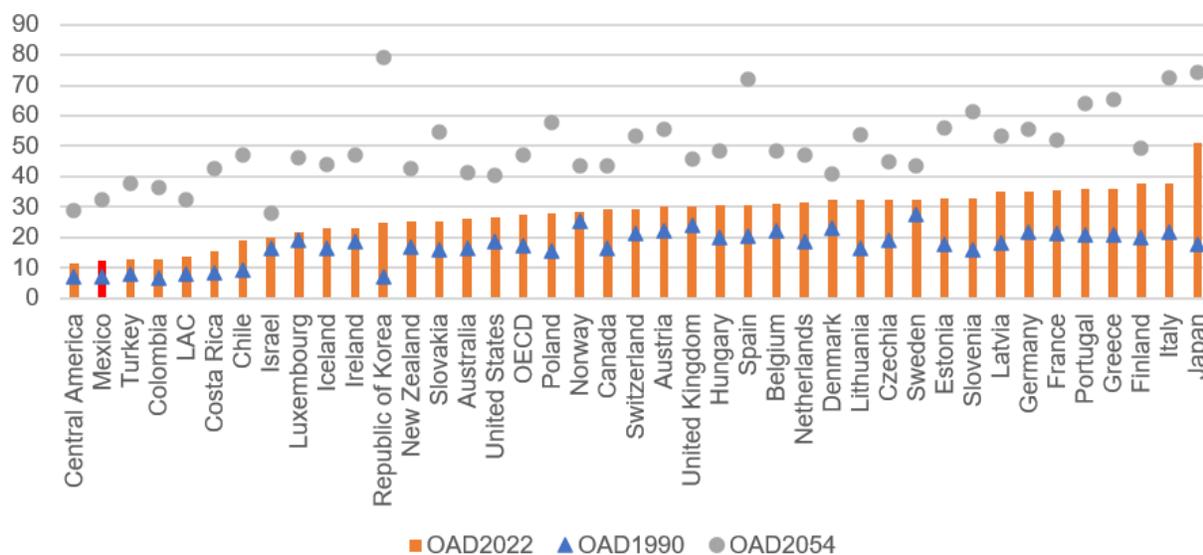
Source: UN Population Prospects 2022.

Because of the young population and low pension coverage, pension spending in Mexico is comparatively low, but it is rising. In 2019 Mexico spent 3.6 percent of GDP on public pensions (up from 1.3 percent in 2000) while OECD countries on average spent 7.7 percent (Figure 3). Spending reached 4.5 percent in 2022. Low earnings-related pension coverage and a relatively young population result in comparatively low spending on public pensions. However, the long and incomplete transition from the pay-as-you-go (PAYGO) system to the funded system, set in motion from 1997, means that public spending on earnings-related pensions lingers, while recent reforms on non-contributory pensions and increased minimum pensions put upward pressure on pension spending.

Figure 3. Pension spending (percent of GDP)
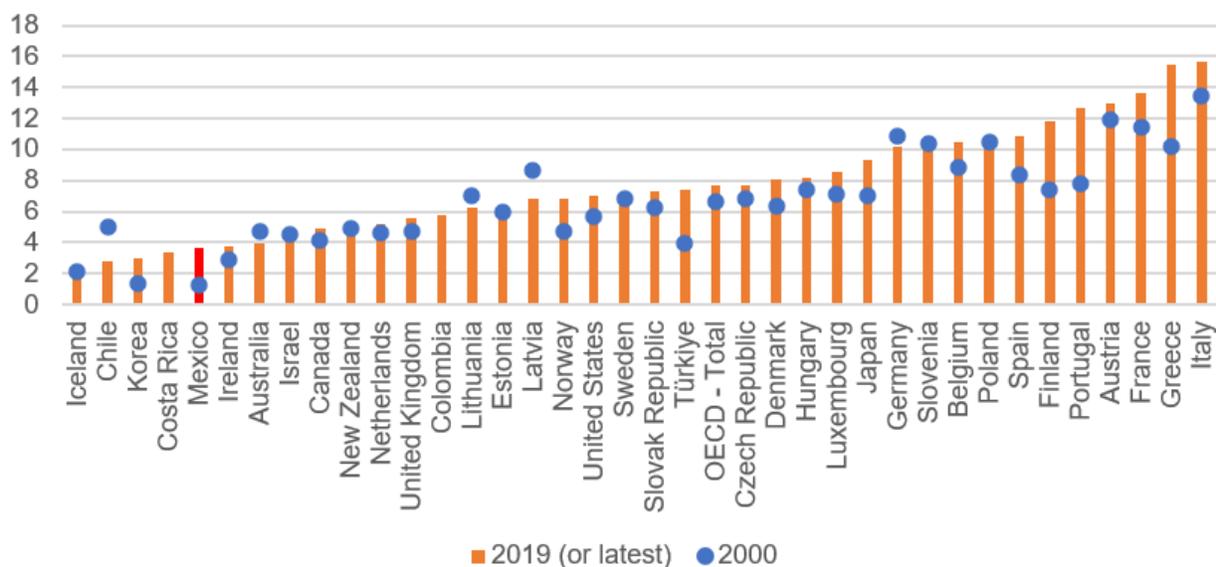
Source: OECD, SOCX database.

The biggest schemes spent 4.5 percent of GDP collectively in 2022 (Figure 4). This consists of 2.3 percent on pensions disbursed by IMSS (of which about 1.7 percentage points are payments under the pre-97 regime), 1.0 percent on pensions for former civil servants and 0.8 percent on the basic pension. The remaining 0.4 percent is spent by CFE and PEMEX. In the past 20 years spending on pensions by the biggest schemes has more than tripled. Pension spending on the old regime is likely to remain high for the decades to come. According to the IMSS it is projected to peak around 2045 at 1097 billion Pesos (expressed in 2020 prices),[6] which is likely to coincide with the retirement of the last workers who contributed to the pre-97.

Figure 4. Public pension spending (percent of GDP

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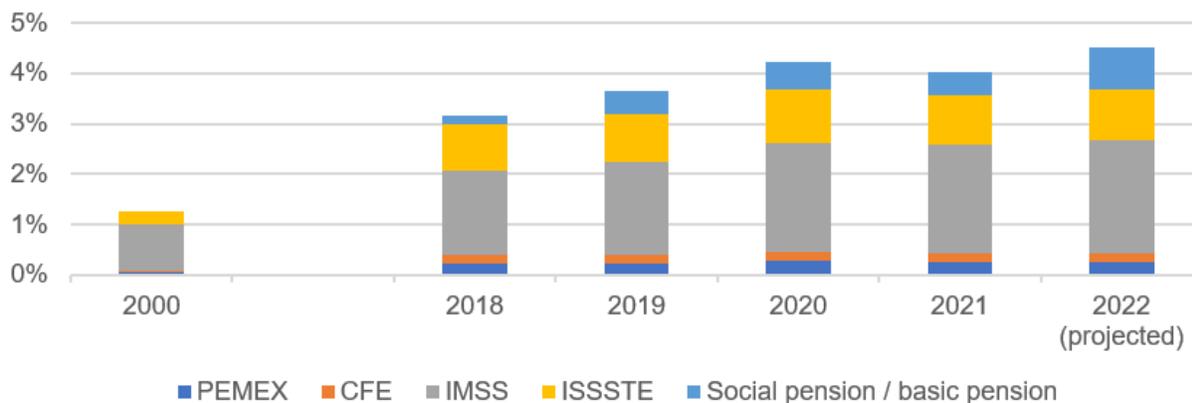
[6] https://www.imss.gob.mx/sites/all/statics/pdf/informes/20192020/21-InformeCompleto.pdf (table 11)

Source: author's calculations based on data provided by the Mexican authorities.

After years of reforms mostly limited to the funded part of the pension system, in 2019 and 2020 two major pension reforms were passed. First, in 2019, the means-tested social pension was replaced by a (residency based) basic pension whose benefit level was raised significantly. Second, in 2020, contribution rates for the funded defined contribution scheme (DC)[7] were raised, minimum pension benefits were increased[8] – while making them dependent on career length, average earnings and age of retirement – and minimum years of contribution requirements to receive an annuity were lowered from 25 years to 15 years, before being raised back to 20 years over time.

The reforms of 2019 and 2020 helped achieve some pension system objectives while serious design inefficiencies were introduced or remain. As Barr and Diamond (2008) note, the primary objective of pensions is to provide economic security in old age, achieved through income smoothing, insurance, poverty prevention, and redistribution; while the primary objective of pension design is to optimize this economic security, including the cost of providing it. As it stands, the recent reforms have improved the system's capacity to redistribute, prevent old-age poverty and, once the increase in contribution rates has taken full effect, the capacity to smooth income. However, the system is influenced by poorly chosen parameters and a large set of thresholds, which both leads to different benefits for people with relatively similar careers and makes the pension system sensitive to economic forces, such as productivity growth, that are difficult to control. Moreover, benefits are raised to levels close to or exceeding benefits promised under the old PAYGO scheme. While this might be the intention of the reforms, it significantly increases the fiscal cost of the pension system, while not addressing the fragmentation of the pension system.

For example, the introduction of the new minimum pension produces erratic results for successive generations, depending on small differences in earnings histories. The replacement rates resulting from the new minimum pension will depend on years of contributions, past earnings relative and the age and year of retirement, all three jointly determining the minimum pension level in discrete brackets. For average-wage earners, retiring at 65, the replacement rate can be very different between successive cohorts of retirees and between different career lengths and labor market entry ages. Estimating the replacement rates for earnings-related pensions of new retirees and extending the projection horizon step by step, the following pattern emerges for successive cohorts of retirees over the years:

1) For average-wage earners, retiring at 65: replacement rates were significantly increased

2) For any career of less than 20 years (blue line), because minimum years of contributions

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[7] A pension system in which benefits are determined by contributions made, combined with returns (net of fees), and annuitized at retirement.

[8] While "minimum pension" is a term sometimes used loosely, this paper sticks to the OECD definition of a minimum benefit of a specific contributory scheme, in the case of Mexico, specifically the minimum benefit awarded to recipients of annuities from the funded defined contribution scheme.

with the introduction of the new minimum pensions, with some differences depending on career length. This is the results of loosened eligibility criteria and raised benefit levels…
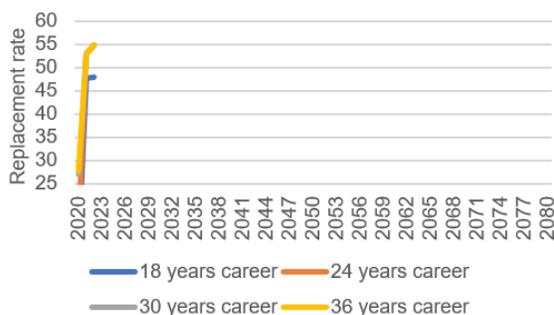
requirements rise again, benefits will fall rapidly from cohort to cohort and will eventually not be awarded to later cohorts…
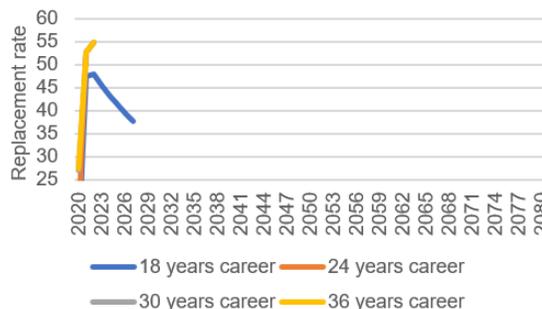
3) For careers of more than 20 years (yellow line), with positive real wage growth, replacement rates will fall because of price indexation of minimum pensions…
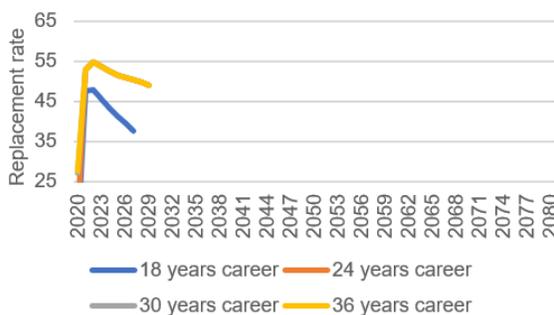
4) With rising minimum years of contributions requirements, subsequent generations with less than 25 years of contributions (orange line) will have an occasionally falling minimum pension…
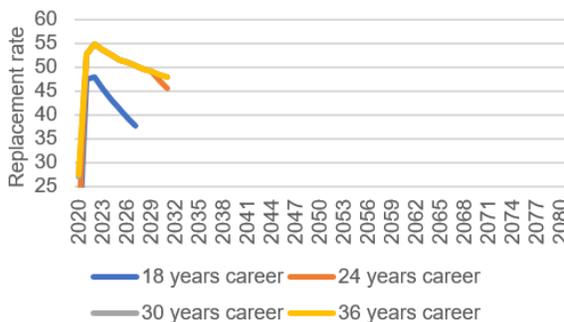
5) Price indexation will again slowly erode replacement rates for all subsequent generations…

6) But because of real wage growth and the price indexation of the wage brackets, over time, subsequent generations might move into higher wage brackets (orange line), which will lead to higher minimum pensions…
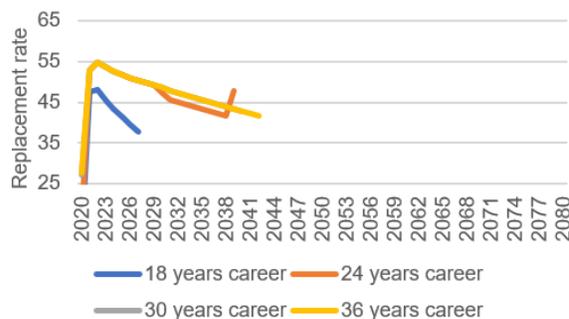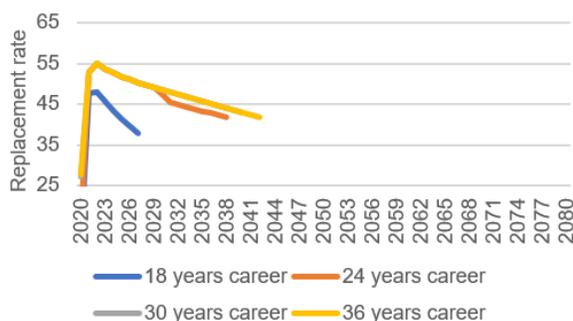
7) However, depending on career length, because past earnings are revalorized using prices, for a similar earnings profile, the jump into the higher wage bracket does not happen at the same time…[9]

8) Eventually, the erosion of replacement rates (because of price indexation of minimum pensions) will cause own pension entitlements of those with longer careers to exceed the minimum pension (yellow line).
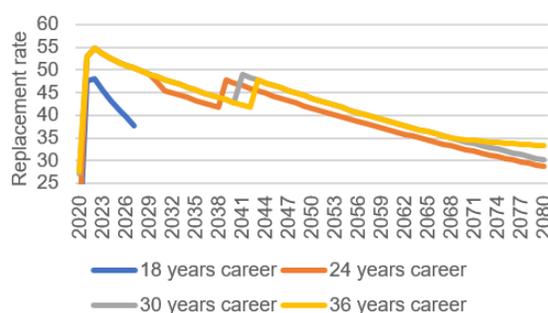
Source: author's calculations.

This volatile behavior is also mimicked in early minimum pensions, with penalties for early retirement depending on career length, earnings profile and year of retirement. In the short run, with rising minimum years of contribution requirements, the benefit level can even fall if an individual works one year longer. In the long run, in some cases, the increase in pensions received from working one year longer, is less than the contributions paid for the extra year of work. In almost all estimations in this paper, the discounted value of future pension benefits from working a year longer (net of contributions paid) are less than the discounted value of early retirement. These design inefficiencies come at a cost of fairness, work incentives and predictability of benefits, which in turn might hurt public trust in the pension system.

The challenge for Mexico is to iron out some of the design inefficiencies while making space for other social spending needs. Currently retired generations have largely retired under the old PAYGO rules or received their

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[9] With real wage growth, price revalorization of past earnings leads to longer, more front-loaded careers having lower average earnings. This means that shorter careers of people entering the labor market at higher ages at certain points in time will jump into the higher wage bracket, while longer careers of early labor market entrants will only change at a later date, leading to higher minimum pensions for shorter careers for some generations.

funded pensions as a lump sum. As a result, recent reforms have sought to solve problems in a pension system that has never been fully in place as intended for any retired generation. At the same time, the likely upward pressure on spending, limits the room for policy makers to implement much needed spending expansions in other areas of social, health and education policy (Hannan et al. 2021).

II. Description of Mexican pension system and past reforms

In 1997 Mexico passed a major systemic pension reform. Since the early 1990s the traditional PAYGO pension system had coexisted with funded defined contributions individual accounts (DC) (OECD, 2016). But the PAYGO system was projected to run ever bigger deficits, and in 1995 it was decided to shut the PAYGO scheme down for new entrants. From July 1997 all private sector workers would contribute to the funded DC system. However, pre-1997 labor market entrants would have the option to receive pension benefits based on the old PAYGO formula at retirement.

The pre-1997 regime and the post-1997 regime co-exist for a very long time. Anyone who has made a single contribution before 1997 can retire under the old PAYGO rules.[10] For example, a labor market entrant aged 15 in 1997, will likely retire in 2047 under the old PAYGO rules and is expected to pass away about 20 years later. Pension reform transition periods are typically long, but a 70-year transition – and likely longer since some individuals will exceed average life expectancy – for the last full benefit under the old system to be paid, is unusual.

The chosen transition also produced very different pension benefits for people with similar careers. Two labor market entrants in 1997 with largely the same career – same career length, same wage and same retirement age – but with one entering in June and one in July will get very different benefits while lifetime contributions are almost the same, with the exception of one month early in the career. In addition, the long minimum years of contribution requirement (25 years before 2021) meant that no person has received the intended benefits

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[10] A full description of both the PAYGO scheme and the funded DC scheme is provided in the next two sections.

under the funded DC system until the reform of 2021. The post-1997 pension system therefore has never been fully in place for any generation.[11]

Box 1. Administrative unit governing pension calculations

The *Unidad de Medida y Actualización* (UMA) has replaced the minimum wage to adjust most social benefits, including pensions in 2016. The minimum wage was used to index benefits, to determine accrual in the pay-as-you-go pension system and to determine government subsidies to private accounts and minimum pensions. In practice, before 2016, this meant close to price indexation since minimum wage increases followed inflation closely (Figure 5). However, social benefits have been decoupled from the minimum wage since 2016 and instead the UMA has been used as unit to adjust benefits. The UMA started out at the level of the minimum wage in 2016 and is indexed yearly with inflation of the previous year. However, UMA and the minimum wage quickly diverged with the minimum wage increasing significantly compared to inflation, averaging a real increase of around 10 percent per year since 2016.

Figure 5. Inflation, wage growth and indexation.
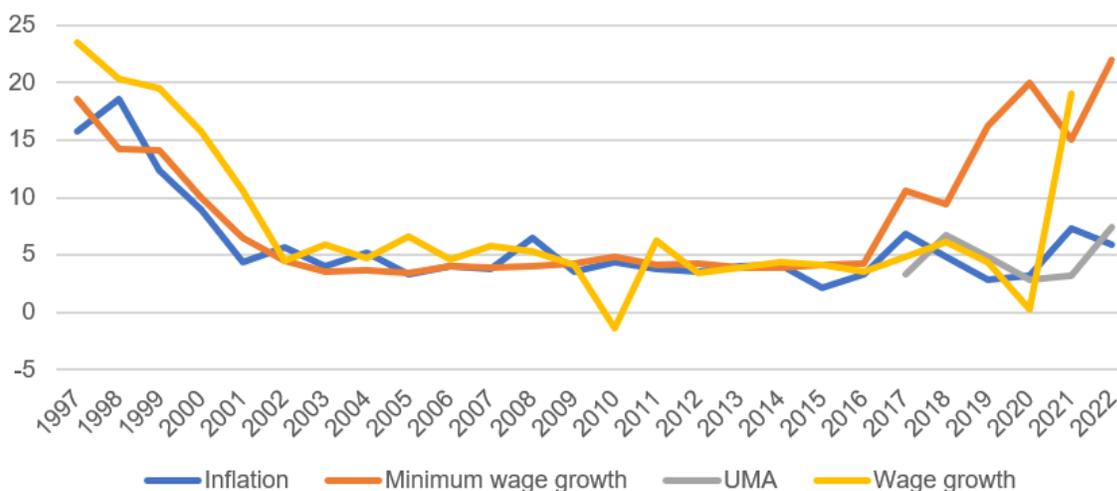
Source: WEO, Mexican authorities

The UMA plays an important role in pension benefit calculations in Mexico. It is used to determine the accrual rate in the PAYGO system, the government contributions to the funded DC system, the initial minimum pension and indexation of both the minimum pension and the basic pension.

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[11] While this incomplete and slow transition of the pension system is problematic, it is not the focus of this paper. For a comprehensive discussion see OECD (2016).

A. Pre-1997 regime: a pay-as-you-go defined benefit scheme

The official retirement age for those retiring under the pre-1997 regime is 65. To retire someone needs at least 500 weeks (approximately 10 years) of contributions. However, a pension can be taken as early as 60 under a scheme officially called "unemployment at older ages". In this case a penalty of 5 percent per year of early retirement is applied.

A little more than a quarter of men and a little less than one in ten women over age of 60 receive an old-age pension from the IMSS (Figure 6a). At the same time, depending on age, between 5-20 percent of women receive a survivor pension (Figure 6b), which leads to relatively similar shares of men and women receiving either an old-age pension or a survivor pension by age group. The strong gender component in pension receipt reflects the generally lower prevalence of (formal) employment among women compared to men. While the beneficiary ratios might sound low in international comparison it should be noted that since 2019 all IMSS recipients are also eligible for the basic pension if they're over the age of 68/65 (leading, theoretically at least, to a 100 percent pension beneficiary ratio). In addition, the fragmentation of the Mexican pension system means that many other older individuals receive pensions from other sources.

Figure 6. Share of population receiving a pension

a. Old-age pension

b. Survivor pension
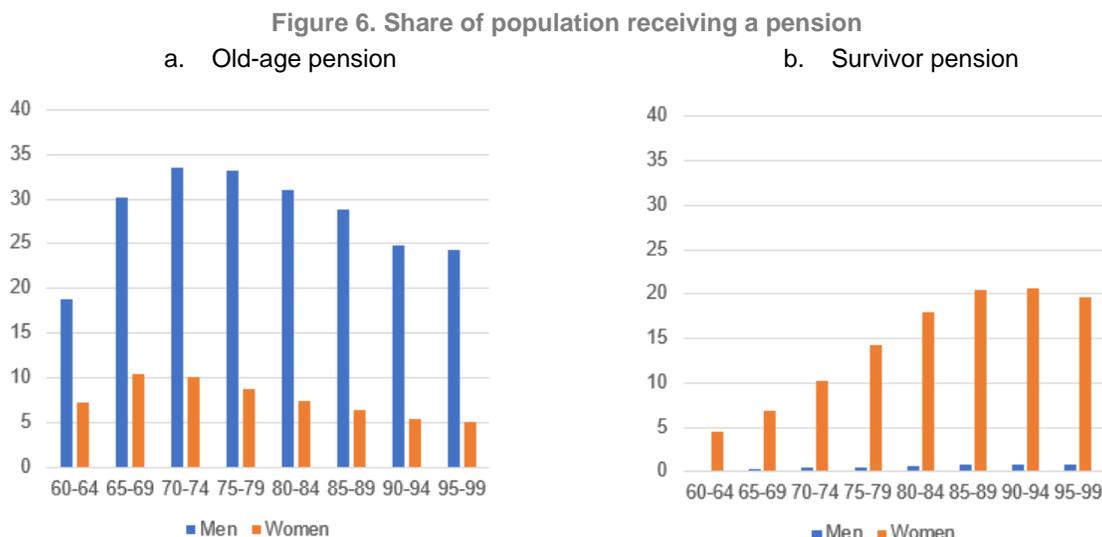
Source: author's calculations based on data provided by the Mexican authorities.

Accrual rates ranges from to 1.3 percent to 8 percent per year for the first 10 years of contributions, depending on past earnings. Both accrual and the reference wage are based on the last 5 years of earnings. Those who have received the minimum wage for the last 5 years have the highest accrual while those who received more than 6 times the value of the UMA (about 1.5 times the average wage, see Box 1) will receive the lowest accrual. However, for contributions in excess of 10 years, minimum wage earners will receive 0.56 percent while high earners will receive 2.45 percent. This means that while people with short careers have very

disparate total accrual but practically the same pension benefits, people with longer careers have similar accrual but benefits that diverge in terms of levels (Figure 7). The old PAYGO system is therefore highly redistributive, especially for shorter careers. In addition, the use of the last 5 years of earnings for the reference wage leads to a redistribution from people with flat wage curves to people with a steep wage curve.

Figure 7. Pay-as-you-go pension accrual and benefits

a.   Total accrual (percent)   b.   Benefits (percent of the average wage)
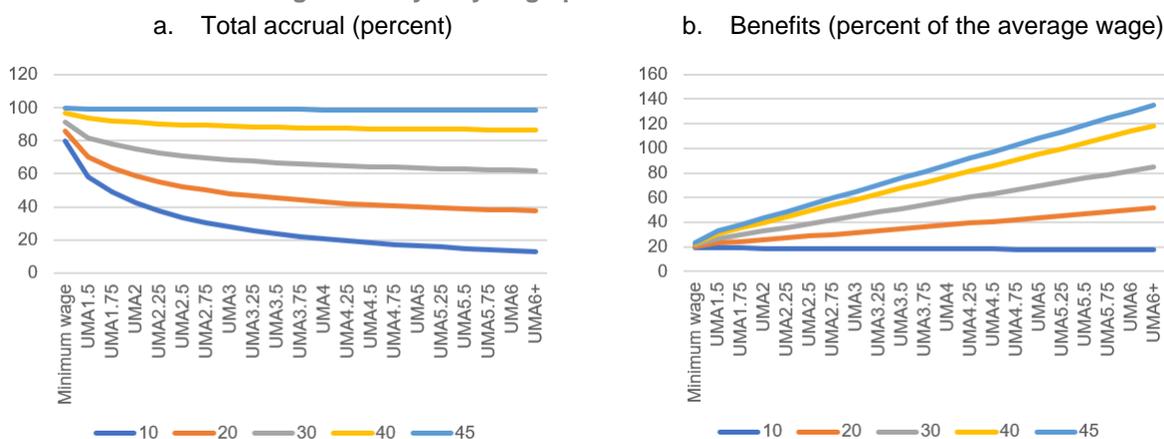
Source: author's calculations.

Pensions in payment are indexed with the increase in the minimum wage. This used to be close to price indexation, however, since 2016 the minimum wage has been decoupled from inflation (see box). Since abandoning the link, the minimum wage has risen in real terms by 10 percent on average every year, creating a large gap in indexation compared to the post-97 regime. Finally, pension benefits cannot be lower than the level of the minimum wage.

The generous benefit formula leads to high benefits. Men at the age of 60 receive an average benefit of 13 thousand Pesos per month or around 95 percent of the average wage (Figure 8). For women this was slightly lower at 10 thousand Pesos (74 percent of the average wage). Benefits fall with age, reaching a little less than 4 thousand Pesos (27 percent of the average wage) per month for those aged 100 and above. Part of this is explained by (essentially) price indexation before 2016 with initial pensions largely determined by (last earned) wages.

Figure 8. Average old-age pension benefits by age (2021, Pesos per month)
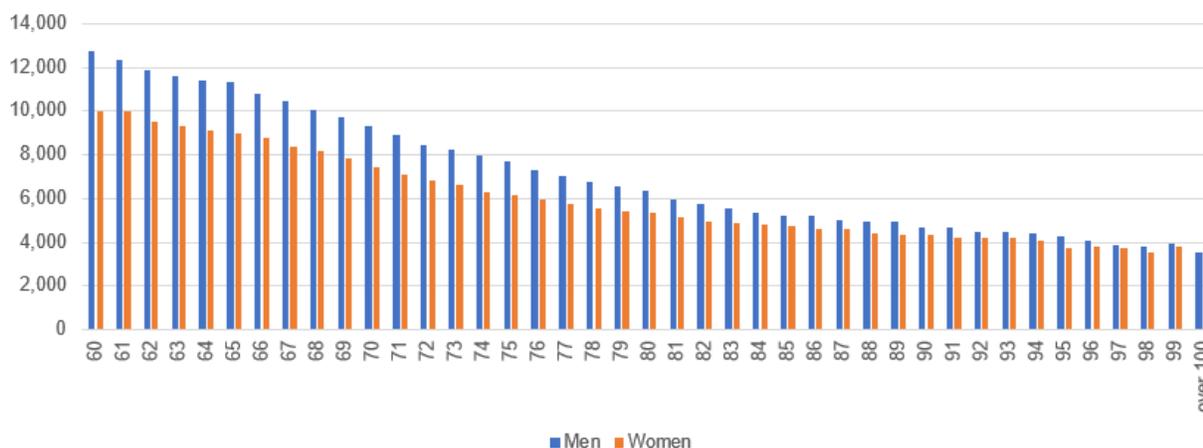
Source: author's calculations based on data provided by the Mexican authorities.

A large share of current active contributors over the age of 40 are expected to be eligible for a pension based on pre-1997 rules. While current contributors' data doesn't show contributions made before July 1997, those who contributed during the last half of 1997 have a high likelihood to also be individuals who made contributions in the old system.[12] From all contributors between the ages 40-65 more than a third of men and more than a quarter of women contributed in 1997 (Figure 9) and are therefore likely eligible for a pension under the old rules. This share logically increases with age with more than 50 percent of men and 40 percent of women close to the retirement age having contributed in 1997.

Figure 9. Share of current contributors who contributed in 1997 (by age).
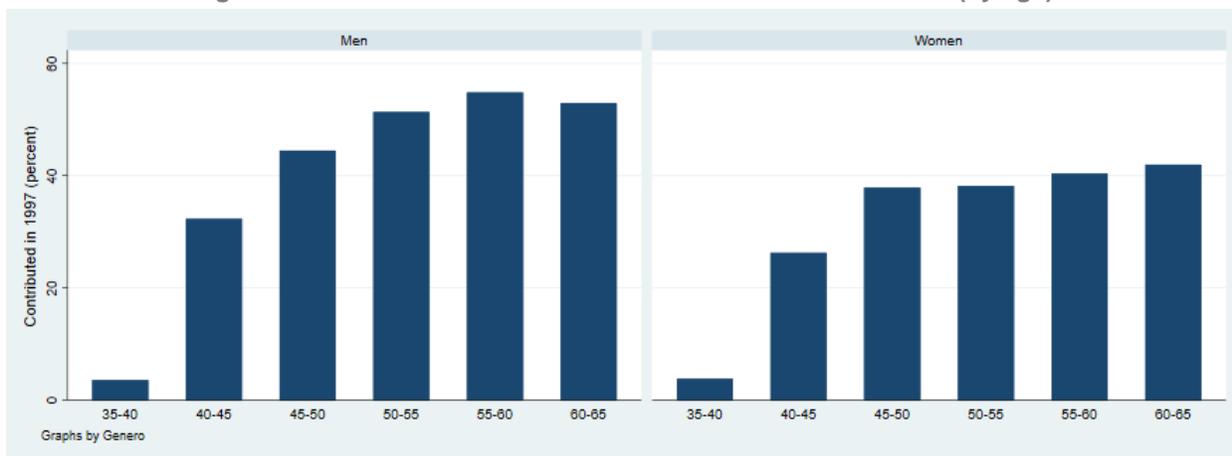
Source: author's calculations based on data provided by the Mexican authorities.

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[12] On the one hand this might be an overcount of contributors to the old system since someone contributing in December 1997 might have just entered the labor market that month. But on the other hand it could be an undercount since people could have breaks in employment, contributing before July 1997 but only continuing to contribute after 1997.

B. Reforms of 1997: transition to a funded defined contribution scheme

Labor market entrants after July 1997 are only eligible for pensions under the funded defined contribution rules. Individual accounts (AFORE accounts) were already present before 1997 but its rules were amended over time. Since 1992 individual accounts had existed for private sector workers.[13] These individual accounts before 1997 were complementary to the pay-as-you-go scheme with a contribution rate of 2 percent paid by employers. With the 1997 reform, the contribution rates were raised to 5.15 percent for employers, 1.125 percent for employees and 0.225 percent contributed by the government, leading to a 6.5 percent total contribution rate. This was the lowest total contribution rate among OECD countries for a long time. For lower earnings there was an additional government subsidy which could raise the total contribution rate to 10 percent for someone earning the minimum wage in 2020.

Before 2021 to receive a pension from the individual account 1250 weeks of contributions were required. Anyone who was not eligible for benefits under the pay-as-you-go rules at the retirement age (still 65) with fewer than 1250 weeks of contributions (about 25 years) would receive their funded DC balance, consisting of contributions plus returns, as a lump sum. Those with more than 1250 weeks could choose between an annuity and a phased withdrawal. Annuities guarantee a lifelong income stream while phased withdrawals simply draw down on the existing DC balance, until either the beneficiary passes away or the funds run out. Annuities cannot be inherited (although survivor benefits can be included, resulting in a lower initial benefit) while positive remaining DC balances after a phased withdrawal are treated as regular assets and can therefore be inherited. In addition to the pensions derived from the individual account, there was a minimum pension for those with low pension entitlements from the DC system. The minimum pension was set at 3.3 thousand Pesos per month but since many people who retired recently were still eligible for the old pay-as-you-go benefits, new minimum pensions in 2020 were only paid to around 600 people.[14] Given the significant fragmentation of the Mexican pension system and the high share of informality, the contribution density in the funded DC scheme is low. Very few people were likely to have contributed long enough to be eligible for an annuity or phased withdrawal, defeating an important goal of any pension system to provide life-long benefits.

Because of the long minimum contribution requirement, actual outcomes of the system as intended by the 1997 reform are difficult to assess. Earning-related pensions were only expected to be paid from 2021 onward (1997 + 1250 weeks), but before these first benefits were paid, the pension system was significantly reformed. However, OECD analysis, on the basis of theoretical replacement rates, showed that the Mexican pension system was projected to provide some of the least generous benefits, largely driven by low contribution rates. Before the most recent reforms, an average wage earner in Mexico who entered the labor market at age 22 in

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[13] The same system existed for public sector workers under the ISSSTE scheme but these workers only transitioned for new entrants since 2007.

[14] For some time, the minimum pension in the post-1997 system were slightly higher than the minimum pension in the old pay-as-you-go system, with the former strictly being price indexed while the latter sometimes was increased by less than inflation (OECD, 2015).

2018, was expected to retire with a replacement rate of 26 percent (Figure 10). Among OECD countries, only replacement rates in the United Kingdom and Lithuania were expected to be lower.

Figure 10. Theoretical replacement rates (base year: 2018)
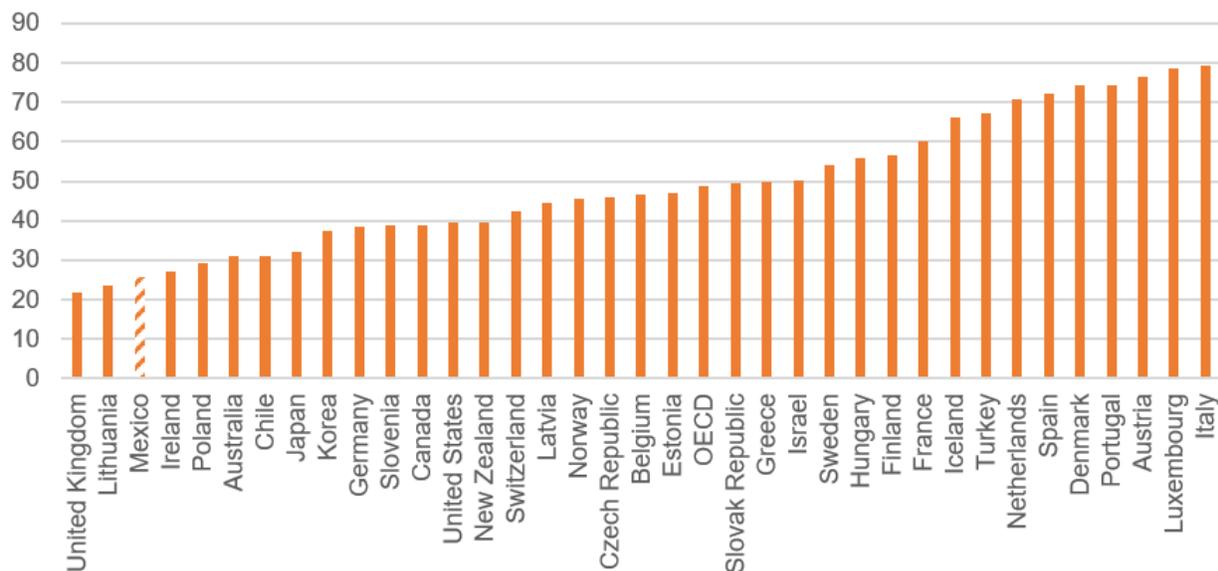
Source: OECD (2019)

III. Reforms of 2019 and 2020

After years of reforms mostly limited to the funded part of the pension system, in 2019 and 2020 two major pension reforms were passed. First, in 2019, the means-tested social pension was replaced by a basic pension. Second, in 2020, contribution rates were raised, and minimum pensions and minimum years of contribution requirements were adjusted.

A. Basic pension

Mexico introduced a social pension relatively recently. In 2003 a non-contributory pension called *Programa de Atención a Adultos Mayores en Zonas Rurales* was introduced for pensioners in rural areas over the age of 70. Building on this initial program, since 2007 a program called *70 y mas* was slowly expanded to include bigger, less rural municipalities. Finally, with the inception of *Programa de Pension para Adultos Mayores* (PPAM) in 2013 the age of eligibility was lowered to 65 – the statutory retirement age – and the program became a standard mean-tested social pension (i.e., eligibility was no longer restricted by the size of the municipality). Almost two thirds of the population over the age of 65 received a social pension in Mexico in 2018, with only Australia, Chile and Korea with equally high numbers among other OECD countries.

In 2019 it was decided to turn the social pension into a universal basic pension and increase its amount. From 2019 everybody over the age of 68, regardless of income, would receive 2550 pesos every two months, a 120 percent nominal increase compared to the PPAM level. Eligibility for the new basic pension, *Programa de Pensión para el Bienestar de las Personas Adultas Mayores* (PBPAM), was extended to everyone over the age of 65 in 2021 and the benefit level again increased significantly, reaching 4800 pesos in 2023 with plans to increase it by 20 percent in 2024.

B. Assessment of the 2019 reform

As a consequence of the 2019 reform, benefits levels have moved from some of the least generous to well above average generosity compared to OECD countries. After making the non-contributory pension universal the benefit rose from 6 percent of average earnings in 2018 to 12 percent of average earnings in 2020; still below the OECD average of 20 percent but comparable to other OECD countries in the region (Figure 11). The increase in 2022 and the planned increase by 2024 will take it past the OECD average to 22 percent, comparable to the basic pension in Greece. [15]

Figure 11. Generosity of social and basic pensions (percent of average wage)
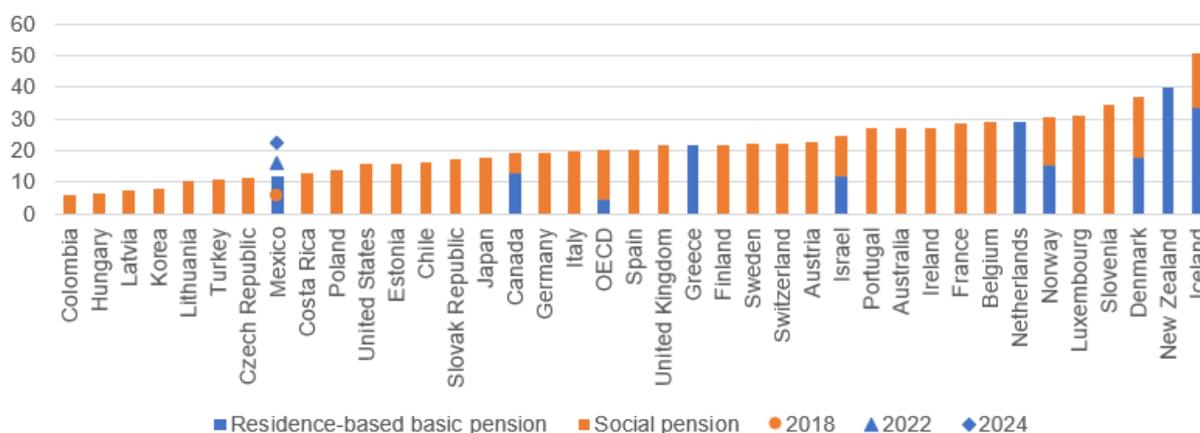
Note: bars represent 2020.
Source: OECD (2021) for 2020 data, author's calculations for other years.

Along with the benefit level, coverage has increased. In 2021, only 3.7 million men and 4.6 million women received the basic pension, which meant that coverage was about 83-85 percent of the eligible population. While this was significantly up from the roughly two-third coverage under the previous program it fell well short of coverage observed in other OECD countries with universal basic pensions (typically close to 100 percent).

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[15] This assumes the average wage between 2022 and 2024 increases by GDP per capita growth as projected in the World Economic Outlook.

By the end of 2022, the total beneficiaries had increased to 10.4 million, which resulted in a coverage of 98 percent.

The effective labor market exit age has come down. According to the OECD, men in Mexico on average left the labor market at age 67 and women at 64 between 2015 and 2019 compared to a statutory retirement age of 65 (for the OECD on average men exited the labor market at age 64 and women at 62). In 2020 the effective age of labor market exit dropped by more than a year for both men and women in Mexico, possibly pointing to a significant income and eligibility effect of the pension reforms. However, a pandemic effect on effective retirement ages cannot be excluded. While women generally have lower labor market exit ages than men in OECD countries, few OECD countries exhibit average labor market exit ages for men significantly above the statutory retirement age. However, Mexico is joined by other Latin American OECD countries like Colombia and Costa Rica whose labor market exit ages also exceed the statutory retirement age by multiple years.[16] Expanding eligibility (also see pension reform of 2020 below) and raising old-age age income could have moved effective labor market exit ages closer to patterns observed in other OECD countries.

Old-age poverty is still widespread in Mexico. Coneval reports that almost nine percent of elderly live in extreme poverty, more than the population on average, and more than a third of the elderly in moderate poverty, which is less than the population on average (Hannan et al. 2021). Relative poverty as reported by the OECD – defined as income less than half the median disposable income – is the highest for the elderly at 20 percent, while the population on average has a poverty rate of 17 percent. However, how old-age poverty compares to the population on average depends on the definition of poverty. Absolute poverty, as reported by the World Bank – defined as living on less than $1.90 a day in 2011 PPP terms – affected 1.4 percent of those over the age of 65 in 2018, which was similar to the working age population but lower than those below the age of 15.

Raising the level of the benefit level and making it universal in 2019 likely reduced old-age poverty. While relative poverty for the population as a whole increased from 16 to 17 percent between 2019 and 2020, poverty for the elderly fell from 27 to 20 percent. Poverty reported by Coneval fell by 5.3 percentage points between 2018 and 2020, which was accompanied by an increase in access to income protection by 12.6 percentage points, mostly due to non-contributory pensions (Coneval 2021). This fall in poverty is not surprising considering the large increase in eligibility and benefit levels. Compared to the relative poverty line non-contributory pension benefits increased from 17 percent in 2018 to 48 percent in 2022 with a larger rise to come. More importantly, in 2022 the basic pension was roughly equivalent to the absolute poverty line.

It also significantly raised the replacement rate compared to the pre-2019 situation. For anyone who didn't receive the means-tested benefits, replacement rates went up by 37 percentage points for minimum wage

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[16] In both Colombia and Costa Rica the effective age of labor market exit for men is 67 years, the statutory retirement age is 62 and 65 respectively. In Chile the exit age and statutory retirement age are both 65 for men.

earners and 14 percentage points for average wage earners in 2022. The planned increase by 2024 will significantly raise replacement rates further, absent large real wage increases in the near future.

Further raising the benefit level is likely to crowd out other social spending needed to meet the SDGs. As Hannan et al. (2021) show, up to 5 percent of GDP is needed by 2030 to reach the sustainable development goals in education, health, roads, electricity, water and sanitation. The current 0.8 percent of GDP spending on the basic pension and the likely increase in the future leaves less fiscal space for these urgent spending needs.

There are certain tradeoffs between means-testing and making benefits universal. It will largely depend on the country circumstances and political preferences which benefit is more suitable:

- On the one hand means-testing targets the poor part of the population better and are likely less costly. Universal benefits are also received by people who are not poor and therefore are less effective at reducing poverty for the same level of spending. For the same level of benefits, means-tested benefits should be cheaper since beneficiaries will be fewer than for a universal benefit and part of the full benefit is potentially clawed back against own income. Spending in Mexico on the basic pension has already increased compared to spending on the social pension. This difference might be exacerbated by ageing and a rise in living standards (which would have led to lower spending on the social pension).
- Universal pension benefits require less administrative capacity. The only information needed is a confirmation of age and residence to start benefits and up to date death registries to end benefit payment. Both are also requirements for the proper implementation of means-tested benefits. But in addition, means-testing either requires reliable information on household income – which can be highly problematic in high informality economies in which actual income is difficult to verify – or it needs to rely on often complicated, opaque and imprecise proxy means-testing techniques, which often leads to large inclusion and exclusion errors. Moreover, the more complicated application process might put off some eligible people to apply for the benefit.
- (Formal) labor supply effects are unclear. Means-tested benefits could lead to reduced incentives to contribute to the pension system, with people trying to avoid being excluded through the means-test. However, while the substitution effect is absent for universal benefits, the income effect is present and applies to more people. More generally, incentive effects of pension benefits might be limited. One of the main reasons to have mandatory pension systems is because of myopia. Assuming people make decisions about (formal) labor supply based on a complicated and – given frequent pension reforms – uncertain benefit calculation sometimes 40 years into the future, seems improbably.[17] However, the labor supply incentive effect might get stronger as people approach retirement and pension benefits become more tangible.

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[17] Labor market informality might anyway not always be a choice.

C. 2020 reform

In 2020 Mexico passed another major reform. The reform affected the contribution rates, minimum pension level, minimum years of contributions and the fees AFOREs are allowed to charge. The entire reform will be phased in over ten years, having started in 2021 with full implementation completed in 2031.

Contribution rates are in the process of being raised from 6.5 percent to 15 percent. Before the reform, employees contributed 1.125 percent of earnings, the government contributed 0.225 percent (plus a so called "social quota" depending on earnings) and the employer contributed 5.15 percent split between two subaccounts: 2 percent going to one account and 3.15 going to the other. Total contributions are set to rise to 15 percent by increasing employer contributions going to the second subaccount to 11.875 percent for high earners while lower earners will be subsidized by the government (Figure 12). While government contribution will change from 2023, contribution rates for employers will only rise gradually until reaching the final values in 2030.

Figure 12. Employer contributions by wage bracket.
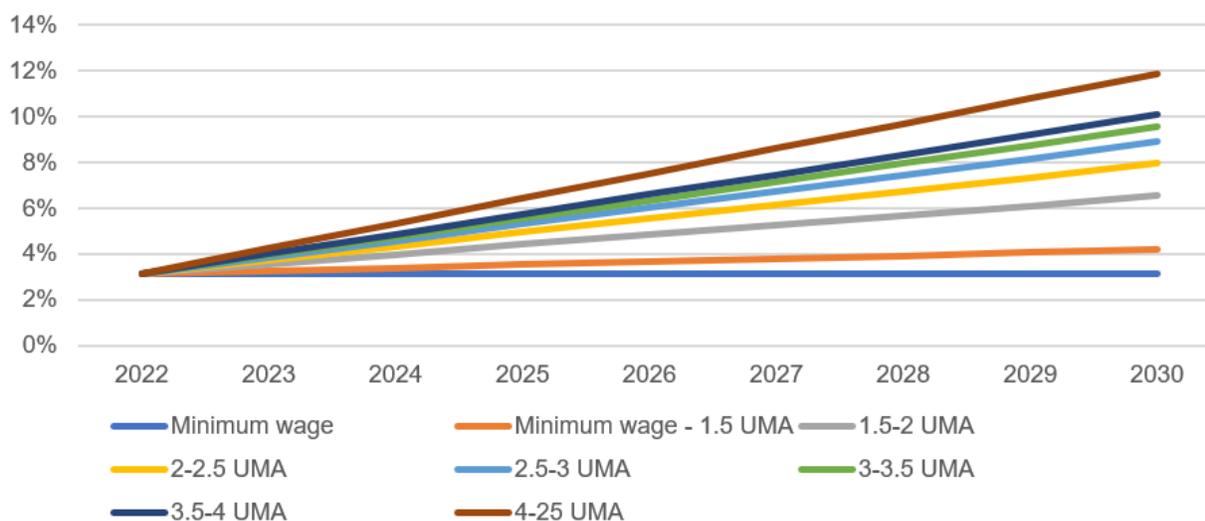
Source: Diario Oficial de la Federacion.

Government contributions are streamlined to make up the difference between the sum of employer and employee contributions and 15 percent. It also means that while currently higher earners receive government contributions in the future nobody earning more than 4 times the UMA will receive government contributions (Figure 13). Currently 4 times UMA is roughly equal to the average wage. However, given that the UMA is indexed with prices, this is likely to fall in terms of the average wage.

Figure 13. Contribution rates

Current situation	Situation from 2031
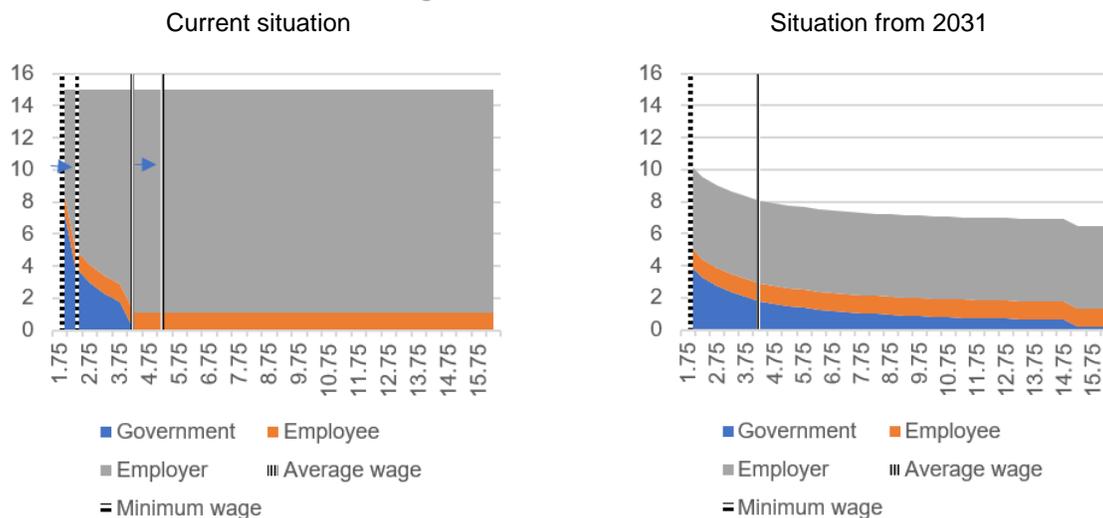
Note: multiples of UMA on the x-axis. Current UMA-average wage ratio is likely to shift because of real wage growth.
Source: author's calculations.

Minimum pension eligibility and benefit levels were also drastically adjusted. The minimum years of contributions needed to receive an earnings-related pension was lowered. Until 2020 the minimum years of contributions was close to 25 years. This was lowered to 15 years in 2021, slowly rising back up to 20 years by 2031. This both holds for the regular pension derived from the DC system as well as the minimum pension. Before 2021 there was only one minimum pension of almost 40 thousand pesos per year (27 percent of the average wage), to be taken at the statutory retirement age without differentiation between previous earnings levels. From 2021 the minimum pension can be taken up to 5 years early, differs by career average earnings (revalorized with prices) and by career length. Moreover, the lowest minimum pension increased to 45 thousand pesos per year (28 percent of the average wage) for someone with 20 years of contributions or more in 2021 while for an average wage earner, with the same career length, the minimum pension more than doubled to 85 thousand pesos per year (53 percent of the average wage).

Finally, fees charged by AFOREs were limited. From 2022, fees cannot exceed average fees in Chile, Colombia and the United States. According to the OECD, average fees in both Chile and Colombia in 2019 amounted to 0.8 percent of assets.[18] The same year, pension funds in Mexico charged 0.9 percent of assets in fees.

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[18] Comparable data was not available for the United States but CNBC reported that in 2019 401k plans charged fees on average 0.45 percent of assets.

D. Assessment of the reform

Minimum contribution requirement

The minimum years of contributions needed for an earning-related pensions under the funded regime were drastically reduced during the 2020 reform. Someone who does not meet the minimum years of contributions requirement will only receive a lump sum, not a permanent benefit. While the reduction was large, minimum years of contribution requirements are still high in Mexico by comparison. For earnings related pensions, Mexico used to be the OECD country with the longest career requirement after the Czech Republic (Figure 14a). While the reduction to about 15 years would bring Mexico in line with a large group of OECD countries, the planned increase to 20 years will still leave them as the OECD country with the third highest requirement. It should also be noted that 15 OECD countries have no minimum requirement (or a requirement of less than a year).

Mexico uses the same minimum contribution requirement for minimum pensions. In this case Mexico stands out less from other OECD countries with minimum pensions. Once the transition has been completed the minimum requirement in Mexico to receive a minimum pension will be in line with Italy, Hungary and Luxembourg, while the requirement for the highest minimum pension will be in line with Costa Rica, Poland and Colombia (Figure 14b). Among OECD countries only France and Switzerland have fully pro-rated minimum pension benefits.
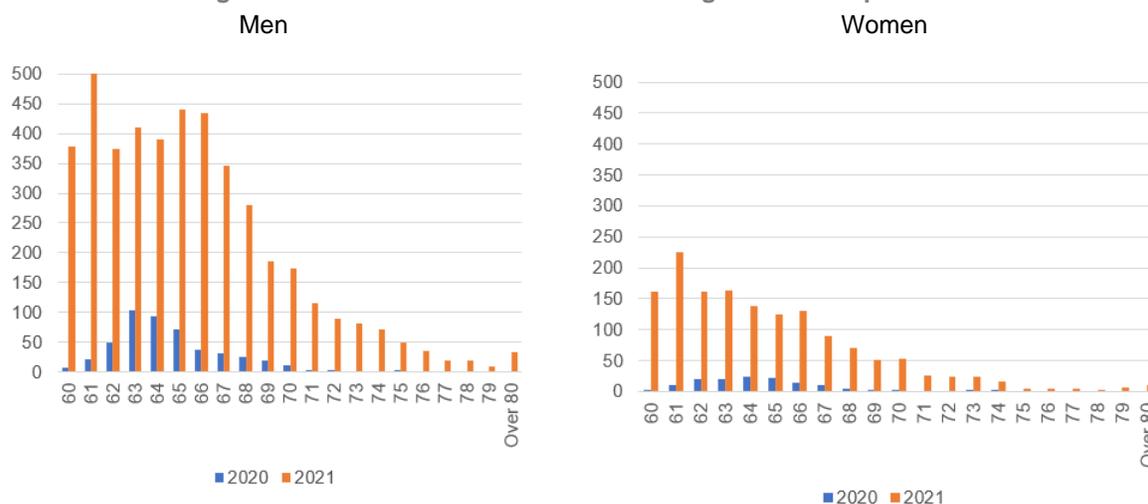
Figure 14. Minimum contribution requirements

a. Earnings-related pension   b. Minimum pension, 2018
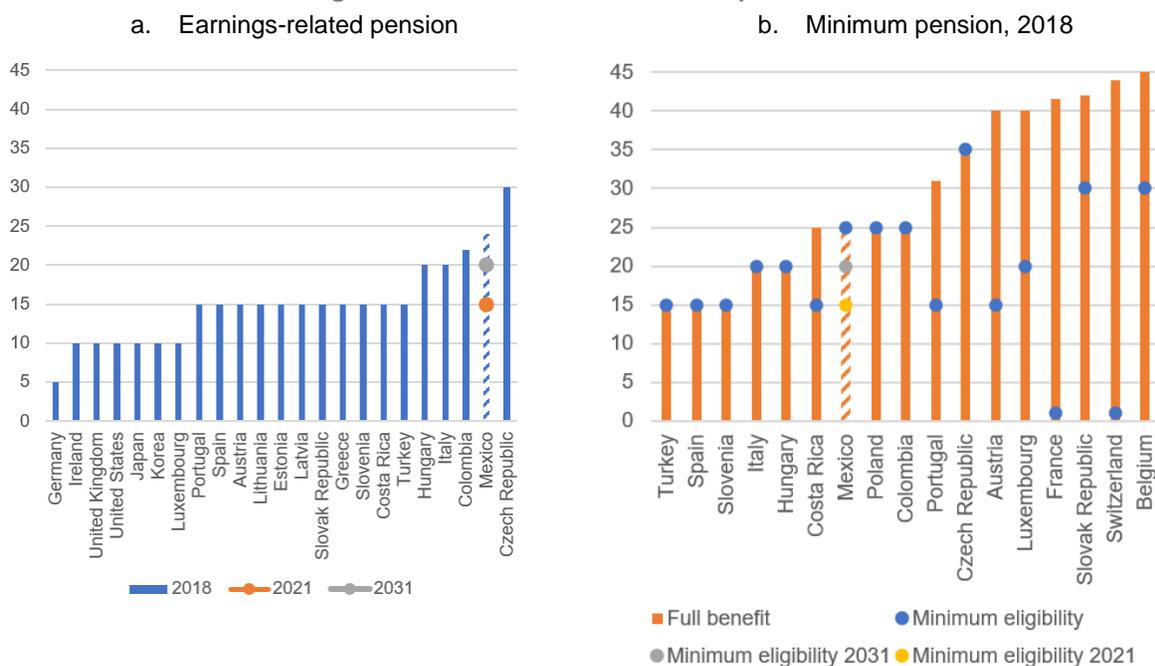
Source: OECD

The change in the minimum pension rules led to a large inflow of minimum pension recipients. This is the result of a combination of lower minimum years of contribution requirement and the possibility to receive a minimum pension early. The number of new retirees receiving a minimum pension increased almost 10-fold between 2020 and 2021, with especially strong growth in new retirees at very young and very high ages (Figure 15). The average benefit in the meantime went up by 20 percent, which is well above the 3.4 percent inflation in 2020 that regular indexation would have suggested. New pension benefit levels went up by 67 percent.

Figure 15. Number of new retirees receiving a minimum pension
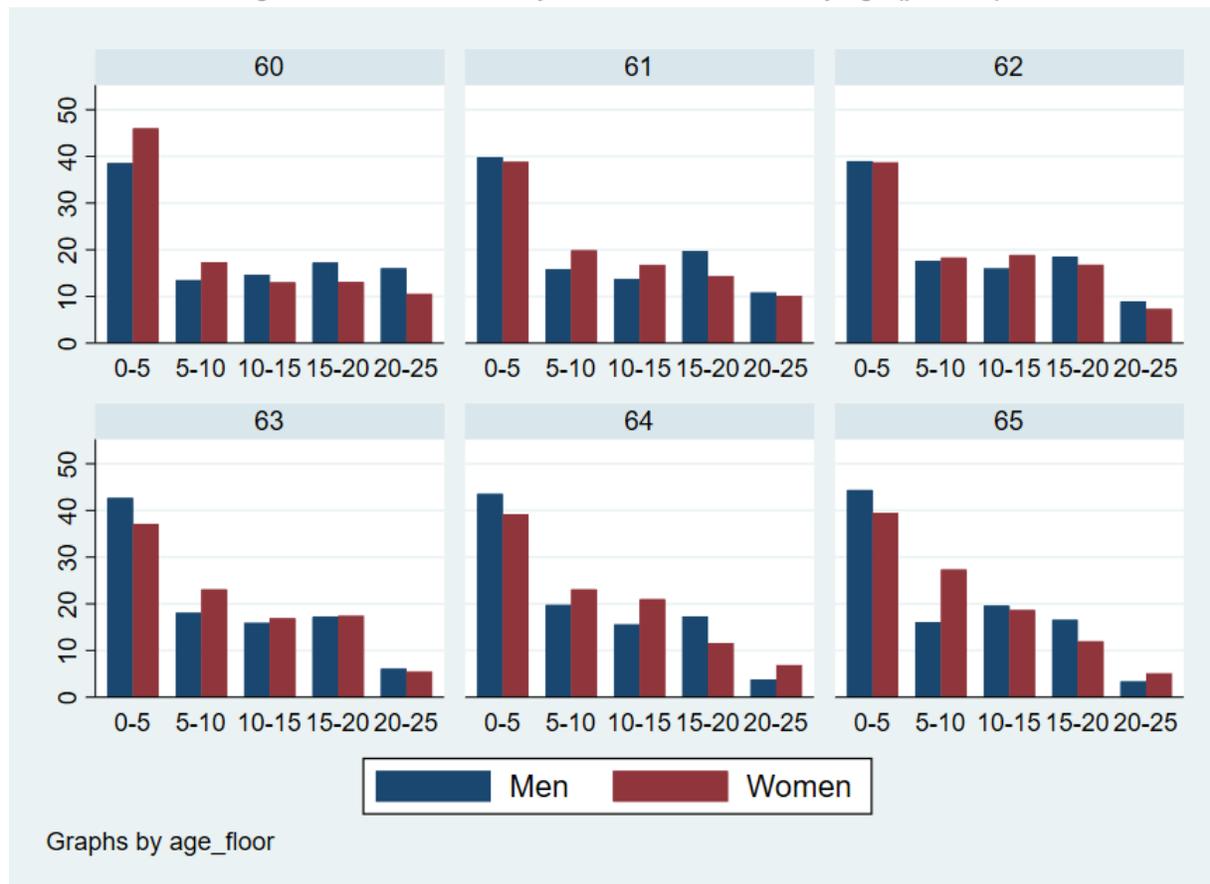

Source: author's calculations based on data provided by authorities

Minimum contribution requirements for funded defined-contribution pensions are unnecessary. Minimum contribution requirements are often claimed to provide incentives to contribute longer. However, it is unclear how that would actually work. For someone with 14 years of contributions who is close to retirement, a 15-year contribution requirement would provide strong incentives (the outcome is either no earnings-related pension at all, or a pension based on 15 years of contributions). But it provides no incentives for someone of the same age with only 5 years of contributions. Moreover, for those who are years removed from retirement, incentives might be limited by myopia. If individuals need mandating to contribute to a pension system because of myopia, it's unclear why planning horizons are deemed sufficiently long for individuals to make sure they contributed long enough at the end of their working life to meet minimum contribution requirements. This is especially problematic in countries where informality, and therefore options to avoid contributing, are widespread. Finally, another argument for minimum contribution requirements is fiscal sustainability. While in PAYGO systems minimum years of contribution requirements therefore implicitly allow for a redistribution from short careers to long careers, fiscal sustainability is of no concern in fully funded DC systems, as long as no government guarantees are given.

It is unclear why the minimum contribution requirements for funded pensions and minimum pensions need to be the same. As figure 14 shows, many countries have higher minimum contribution requirements for minimum pensions than for regular earnings-related pensions. Belgium for instance has the highest requirement for a full minimum pension but no minimum contribution requirement for a regular earnings-related pension at all. While minimum pensions sometimes serve to reward long careers, ordinary earnings-related pensions do not fulfil this function in most countries (nor should they).

The minimum contribution requirement is still much too high, leaving many contributors (unnecessarily) without permanent pension benefits. Of current contributors around 40 percent of both men and women between the ages of 60 and 65 have 5 or fewer years of contributions (Figure 16). With the exceptions of ages 60 and 61, less than 10 percent has reached between 20-25 years of contributions. Indeed, the average contribution density over the period 1997-2020 has been 40 percent. Which means to reach 20 years of contributions by age 65, the average contributor needs to start working at age 15. One of the reasons behind the low contribution density is the large informal sector, with many people switching from formal to informal work and vice versa during their working lives, and the fragmented pension system with limited portability, leaving many people with insufficient entitlements in multiple schemes. While lowering the minimum years of contributions required from 25 to 20 years certainly helps to increase earnings-related pension benefit receipt, it will still leave the majority of contributors without permanent pension.

Figure 16. Distribution of years of contributions by age (percent)

Graphs by age_floor

Source: author's calculations based on data provided by authorities

Benefit levels

The combination of the 2019 and the 2020 reforms has dramatically increased expected benefits of the Mexican pension system for post-1997 labor market entrants. Depending on eligibility, average wage earnings with different career lengths will receive very different benefit under the different systems that are/were in place. However, the new system produces benefits that are much closer to the old PAYGO scheme with some important differences:

- For an average wage earner with a 16-year career (Figure 17, first row), the benefits under the (pre-97) pay-as-you-go system in 2022 would be a combination of the basic pension, the earnings-related part of the old system and a minimum pension topping the pension up to the minimum wage level. This results in relatively stable replacement rates, 20 and 40 years later (2042 and 2062), of about 50 percent.[19] The only slight fluctuation comes from initially rising and then falling basic pension levels

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[19] These intervals are chosen to be long enough to see changes over time and for the final year to produce benefits entirely produced under the new stable rules.

compared to the average wage.[20] While projected replacement rates for the pre-2019 DC system were projected to be much lower, they are equally stable, slowly falling because of rising life expectancy and falling government subsidies.[21] However, the new pension system (post 2020) leads to highly different replacement rates. First, in 2022 the replacement rate is made up of the basic pension, entitlements derived from own contributions, employer contributions and government contributions and finally a minimum pension. Over time the basic pension and the rising employer contributions start to dominate. The minimum pension will not be received by those retiring in 2042 and 2062, since by then the minimum requirement will be 20 years of contributions. So while replacement rates in 2022 will be similar to the pay-as-you-go system, replacement rates will fall for later generations, even though they will still be well above the pre-2019 DC system.

- This is different for the longer careers under the post-2020 rules. Under the new rules, an individual with either a 24- or 32-year career would be eligible for a minimum pension now and in the future (Figure 17, second and third row). However, own entitlements would eat into the minimum pension quicker for a longer career. Since minimum pensions are indexed to prices, the replacement rates expressed as share of last earned wage will fall. For higher earnings levels this might even lead to not being eligible for a minimum pension anymore (see Annex I).

- Chosen real wage growth and real returns for the replacement rate simulations have an impact on the composition of the pension benefits. Higher real wage growth leads to a faster decline in replacement rates for those receiving the basic pension and a minimum pension, because both are indexed with prices. The difference is almost entirely made up of a smaller replacement share of the basic pension and of the minimum pension top up. The own pension part declines less since the only negative effect comes from a smaller difference between real wage growth and real returns. Higher real returns on the other hand have no effect on replacement rates for those with minimum pensions. The only effect would be that a larger share of their replacement rate would be self-financed. It could mean that certain scenarios would exceed the minimum pension level. High enough returns for instance could easily push the own pension of an average wage earner with a 32-year career over the minimum pension benefit.


Box 2. Modeling assumptions

Throughout the next sections, the following assumptions are made. World Economic Outlook numbers are used until 2025, thereafter 2 percent inflation and 2 percent real wage growth. Nominal returns follow 3 percent plus inflation from 2021 onwards. The minimum wage follows average wage growth. UMA is indexed with prices. AFORE accounts are converted into phased withdrawals based on life expectancy at the age of retirement.

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[20] The basic pension rises with more than average wage growth until 2023 after which real wage growth will slowly erode the basic pension level relative to wages.

[21] In this case the replacement rates take into account AFORE balance – which would be paid out as a lump sum – assuming these lump sums are converted into phased withdrawals against the same conditions as those who receive an official annuity or phased withdrawal. Hence the dashed appearance.

Figure 17. Replacement rate for an average wage earner (by pension system and career length)
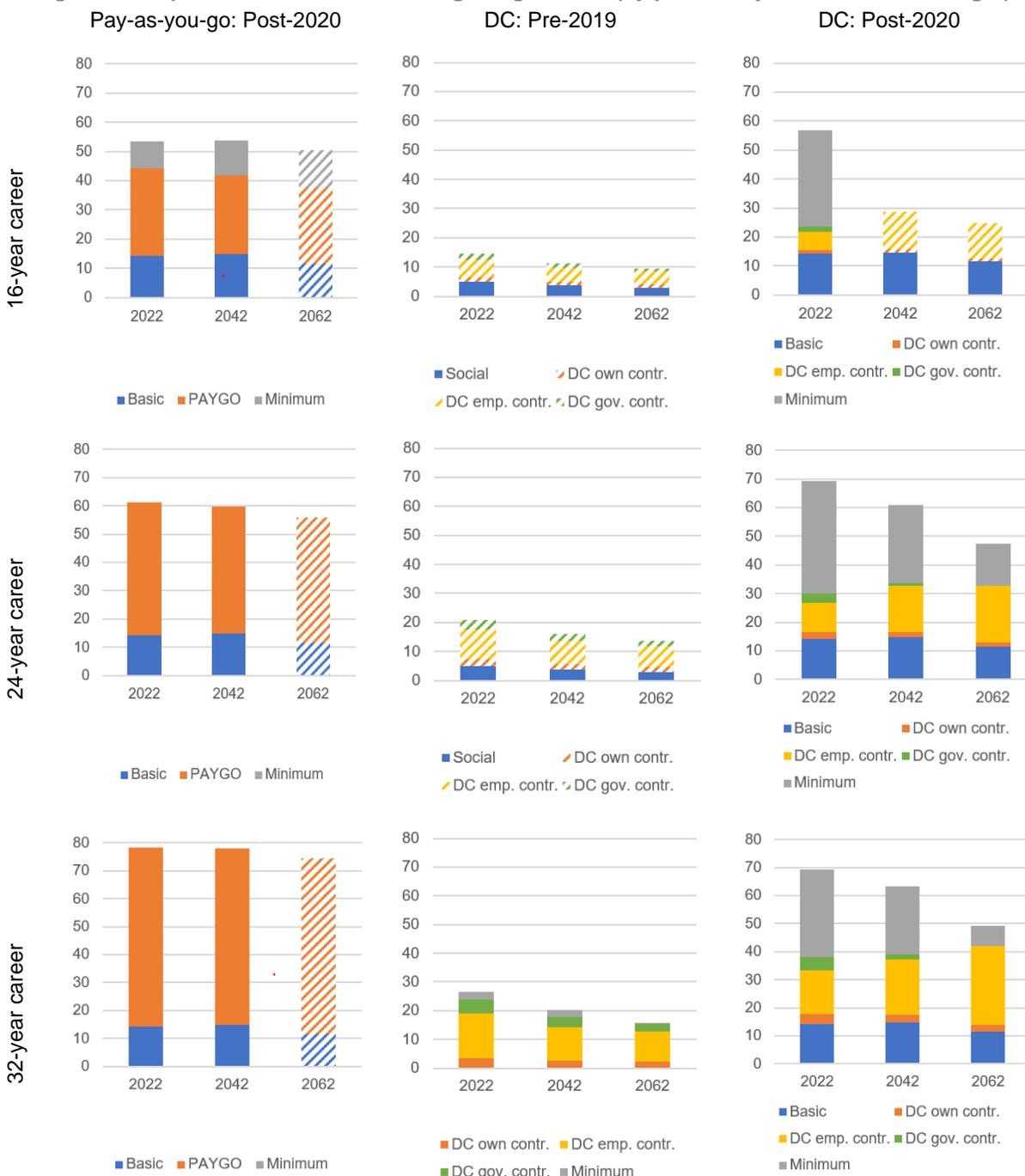
Source: author's calculations
Note: dashed lines indicate implied pension benefits. For the pay-as-you-go scheme, no new pensions will be paid in 2062, since the last affiliate is expected to retire at the end of the 2040s. For the pre-2019 DC scheme, no permanent benefits are provided for people with careers of less than 25 years. Benefit levels reflect if annuitization was a possibility. For the post-2020 DC scheme no permanent benefits are provided for people with fewer than 20 years of contributions from 2031 onwards.

Parametric choices

The parameters for the pension system are sub-optimal. First, the price indexation of most brackets determining government contributions combined with the minimum wage constituting its own bracket causes the slow absorption of subsequent brackets into the minimum wage bracket. Second, the same mechanism gradually pushes people into higher minimum pension brackets because of real wage growth, but the extend will depend partially on the steepness of the wage curve of an individual but also career length. While price indexation can be a useful instrument to limit fiscal cost, the threshold effects present in the Mexican pension design are not inevitable and can be smoothed out using more continuous functions.

Since delinking pensions from the minimum wage there is a disconnect between the definition of the brackets determining government contributions - linked to inflation - and the yearly adjustment of the minimum wage. While price indexation of both brackets and government contribution levels are prudent from a fiscal sustainability perspective (i.e., once welfare increases subsidized contributions can be phased out), this should ideally be applied to all brackets. Currently the minimum wage – which constitutes its own bracket when it comes to government contributions – increases in real terms. This is problematic for pension outcomes for two reasons. First, the minimum wage bracket will slowly exceed each subsequent bracket (Figure 18). At the moment the bracket that falls between 1.01 minimum wage and 1.5 UMA is already not well-defined since the minimum wage is higher than 1.5 times UMA. If real minimum wage growth keeps its current pace (i.e., 10 percent per year since 2016) it would mean that by the time the reform has been fully implemented the brackets have fully disappeared and only the minimum wage bracket is left,[22] meaning only minimum wage earners receive a government contribution. Second, during this slow collapse of contribution brackets, people with relatively similar earnings will receive very different government contributions. For example, in the figure below, the government will contribute 10.75 Pesos a day in 2025 indexed to reflect inflation for someone earning a minimum wage. Someone earning one Peso more, on the other hand, will receive only 7 Pesos since they will fall in the 3.01-3.50 UMA bracket. Instead, it will be the employer contributing making up the difference on their behalf in the future, which might have implications for wage setting and labor demand.

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[22] Faster real minimum wage growth would speed up this process, while slower real minimum wage growth would slow the process. However, any real minimum wage growth would eventually lead to the disappearance of other brackets.

Figure 18. Government contribution brackets
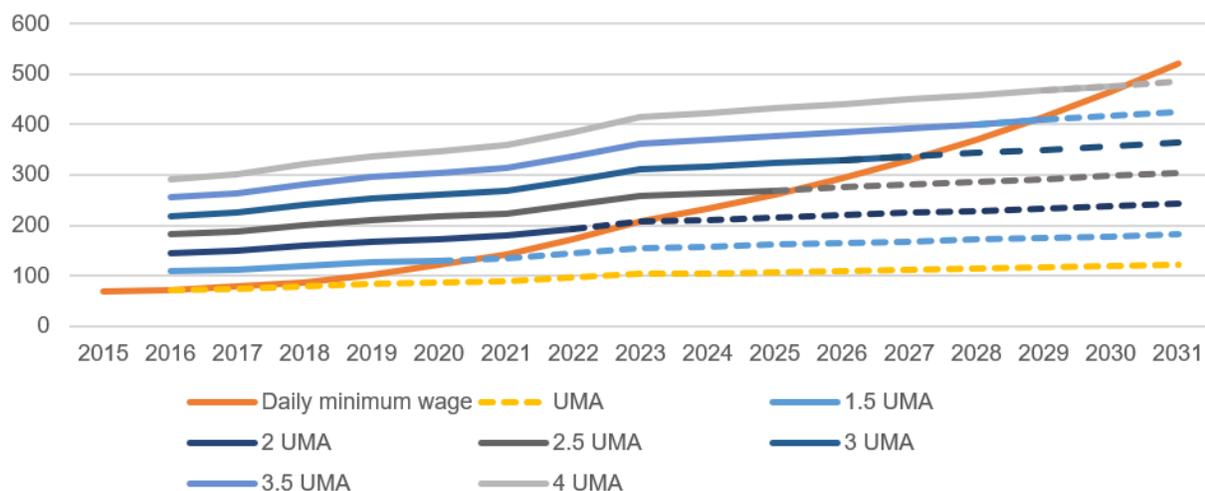
Source: author's calculations
Note: Minimum wage and UMA data is used until 2023. Afterwards minimum wages grow at 10 percent in real terms each year, while the UMA remains constant in real terms.

The wage brackets determining the minimum pension have a similar problem and additional issues. The reference wage brackets to determine minimum pensions (the minimum benefit received in the earnings-related scheme) are also drifting over time in relative terms. Currently, someone with price uprated career average earnings equal to 75 percent of the average wage will fall in the 3-4 UMA minimum pension bracket. Assuming a 2 percent real wage increase in the future the same person would fall in the 4-5 UMA minimum pension bracket by 2030. Like the government contribution brackets, some minimum pension brackets will become ill-defined. At the moment, the lowest minimum pension bracket is defined as covering the range of revalorized career average earnings between 1 minimum wage and 2 UMA. If the minimum wage keeps growing in real term it will soon exceed 2 UMA. Moreover, average revalorized minimum wages fall below the lowest bracket (i.e., price revalorization does not compensate past earnings for real minimum wage growth). This means that technically, those who earned a minimum wage for a full career and who would be eligible for a minimum pension according to their career length and according to their own entitlements (i.e., low enough) would not receive a minimum pension since no minimum pension bracket is defined for average career earnings of less than the current minimum wage. Minimum wage earners will only become eligible for a minimum pension once their career average earnings exceed 2 UMA in the future.
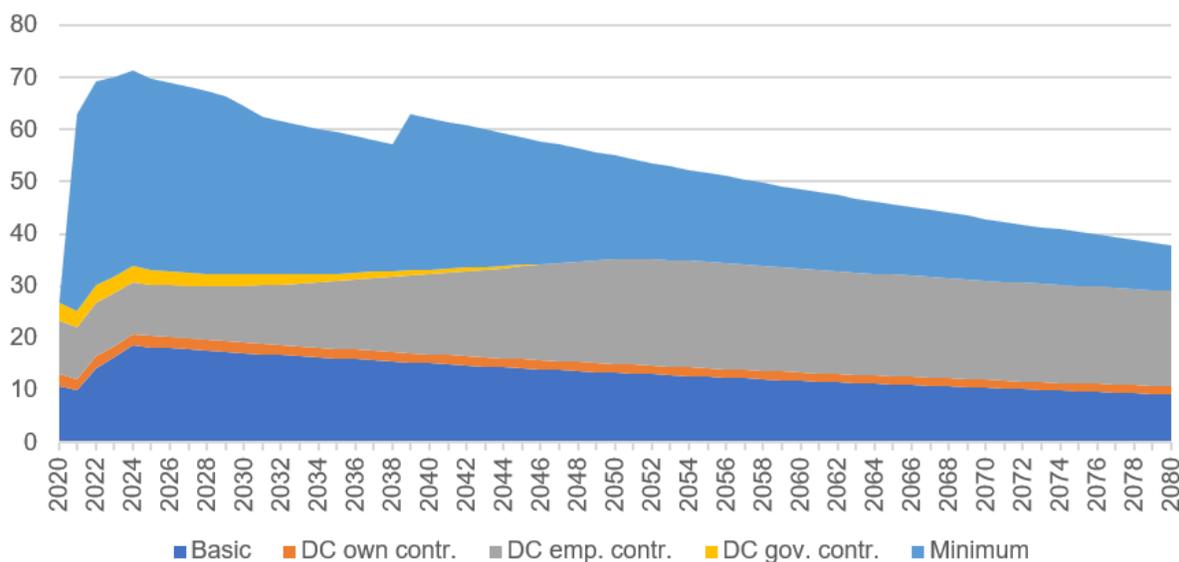
Minimum pension benefits

The minimum pension changed from a single benefit to a benefit variable by wage level, career length and retirement age. Before 2021 there was only one minimum pension of almost 40 thousand pesos per year, to be taken at the statutory retirement age without differentiation between previous earnings levels. From 2021 the minimum pension can be taken 5 years early, differs by career average earnings (uprated with prices) and by

career length. Minimum pensions increase with career length and average earnings but fall for each year of early retirement.

Minimum pensions at the normal retirement age

The outcomes over time of the minimum pension create an erratic replacement rate pattern. Looking first again at different generations who earned the average wage for 24 years and retire at age 65 we see that initially replacement rates jump between 2020 and 2021 because of the introduction of the minimum pension for that career length (Figure 19). After that replacement rates rise further for next generations because of the increase in the basic pension. However, slowly replacement rates fall after 2024 for two reasons. First, the basic pension and minimum pension benefits will fall in terms of the average wage because of price indexation. Second, the minimum requirements for a minimum pension will slowly rise, leading to 24 years no longer being the highest bracket. At the same time entitlements from employer contributions will rise while entitlements from government contributions will fall for reasons explained in the previous sections. Finally, the jump between 2037 and 2038 is caused by average wage earners' reference wage moving into the highest wage bracket (again caused by the bracket drift compared to wages, explained earlier).

Figure 19. Replacement rates over time for average wage earners with a 24-year career

Source: author's calculations.

Over time, minimum pension benefits will fall in terms of the average wage, at the same time workers with the same wage relative to the average wage, will get pushed into higher minimum pension brackets or even out of the highest minimum pension. To avoid mixing effects of the 2019 and 2020 reform, the basic pension is ignored in the rest of the section.

Starting with careers of 26 years or more (i.e., those who are always in the highest career length bracket of the minimum pension), all generations earning half the average wage for all career lengths are projected to receive a minimum pension. After the initial jump in replacement rates because of the increase in minimum pension benefits, relative benefits of the minimum pension will decline because of price indexation (Figure 20a). Because of real wage growth and the price indexation of the wage brackets, over time, subsequent generations will move into higher wage brackets. But this happens for shorter, more back-loaded careers first. Because past earnings are revalorized with prices, longer careers with a higher contribution density at younger ages are penalized (assuming real wage growth). The extra years someone worked at the beginning of their career actually pulls their average (revalorized) wage down in comparison with those who followed the same wage curve starting later (see Annex II). In later years, each subsequent career length scenario moves into the higher career earnings bracket, therefore receiving a higher minimum pension. This pattern repeats itself as the brackets drift, as visible in the scenario for half the average wage.

For the average wage on the other hand, own entitlements of individuals with longer careers eventually will exceed the minimum pension level (Figure 20b). While the eventual exceeding of the minimum pension by own entitlements is the natural and desired result of price indexed minimum pension levels, limiting the fiscal cost of the minimum pension, the sudden jumps into higher wage brackets are the result of a flawed bracket design. These dynamics are only transitional in the sense that with real (minimum) wage growth eventually even minimum wage earners will eventually be in the highest wage bracket. However, this eventual stabilization makes the brackets redundant at the same time.

Figure 20. Replacement rates over time by wage level and career length
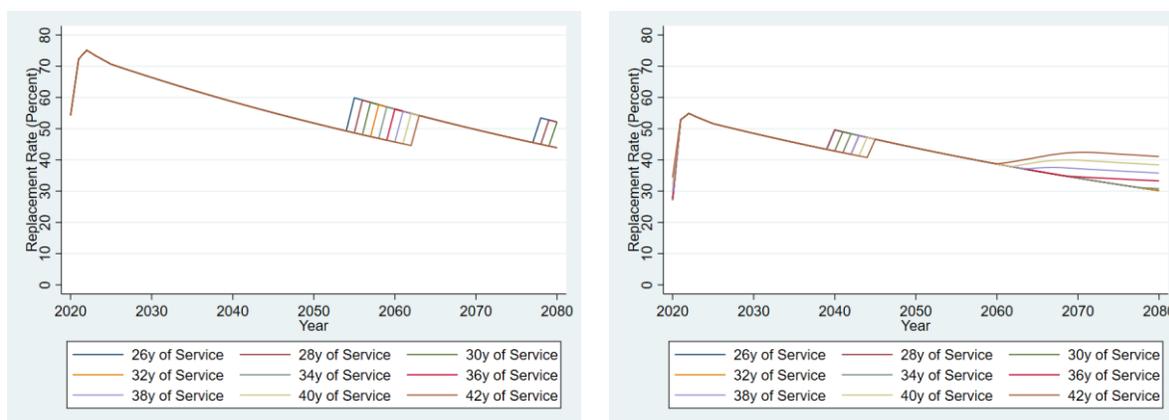
| a.   Half average wage | b.   Average wage |

Source: author's calculations.
Note: each observation represents one generation's retirement year. For instance, the observation 2030 is for the generation born in 1965, the observation 2031 for the generation born in 1966. Basic pensions are excluded in this graph.

Shorter career lengths produce even more volatile replacement rates because subsequent generations not only move through wage brackets but also career length brackets. First, those with 14 years of service will not

receive a minimum pension (Figure 21a and 21b). Second, only the generations retiring between 2021 and 2030 with more than 15 years of contributions but less than 20 might receive a minimum pension. The shorter the career length the quicker the subsequent generations will lose their eligibility for a minimum pension due to the rising minimum years of contribution requirement. These transitional dynamics are the result of choosing first to lower the minimum years of contribution requirement and then raising it again. It is unclear why a 16-year career is deemed sufficient for a minimum pension in 2021 but not after 2024. Those with 20 years of contributions or more will always be eligible for a minimum pension but apart from the patterns described above (i.e. moving through wage brackets) they will also move through career length brackets. Each subsequent generation will be in a lower bracket as minimum contributions requirements are slowly raised to 1000 weeks (about 20 years), while minimum contributions requirements for the highest minimum pension will slowly be raised to 1250 weeks (about 25 years). Afterwards, the usual moving up the reference wage bracket dominates. However, since the different career length scenarios are in different career length brackets, rather than catching up with each other as in the figure above, each career length scenario leapfrogs each other from time to time. The jump happens in earlier years for shorter more back-loaded careers, with less contribution density at earlier ages, because average earnings for shorter careers are higher because of price revalorization of earnings (see Annex II).

Figure 21. Replacement rates by wage level and career length
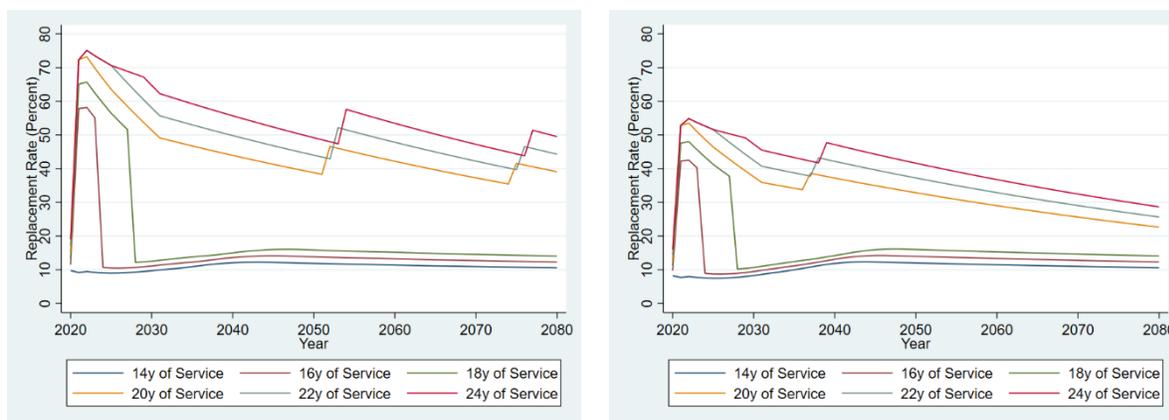
a.   Half average wage   b.   Average wage

Source: author's calculations.
Note: each observation represents one generation's retirement year. For instance, the observation 2030 is for the generation born in 1965, the observation 2031 for the generation born in 1966. Basic pensions are excluded in this graph.

Apart from the inequitable outcomes and ambiguous labor supply incentives, price revalorization of past earnings benefits individuals with steeper wage curves and makes minimum pension dynamics sensitive to real wage growth. Two individuals who over their full career have contributed at the average wage but with differently sloped wage curves, will have different price revalorized career average earnings and therefore different minimum pensions. Moreover, higher real wage growth would lead to earlier, more frequent movements between wage brackets.

Early minimum pension

The possibility to take a minimum pension early complicates matters more. First, the implied penalties of the minimum pension interact in a less than optimal way with the parametric choices mentioned above. Second, actuarial neutrality – i.e., the conditions in which the present value of accrued pension benefits remains the same whether someone works one more year or not – cannot be defined for a minimum pension as currently designed.

Using the same pension calculations above can help to assess the expected effects of early retirement on minimum pension entitlements. Retiring one year early for someone with a 23-year career at the average wage compared to working and contributing one more year (i.e., a 24-year career) results in a 1 percent lower pension until the generation retiring in 2027 (Figure 22a). The reason is that a 23-year career falls in the highest career length bracket for those early years after the 2020 reform. Afterwards the penalty increases as a 23-year career falls in consecutively lower career length brackets. For even earlier retirement, the pattern of the lower benefits for each year of early retirement is largely similar except that the tumble down the career length ranking starts earlier. However, occasionally, early retirement also leads to falling in a lower reference wage bracket, which leads to the strange downward spikes. This is essentially the reverse of the pattern described above: instead of having one extra year at the beginning of a career, later retirement leads to one extra year of contributions at the end of a career, *increasing* the average revalorized wage for later retirement. For a 5-year early retirement the penalty eventually will be very high since no minimum pension eligibility exists for 19-year careers from 2030 onward.

Figure 22. Reduction in pension benefits for each year of early retirement (compared to a 24-year career)
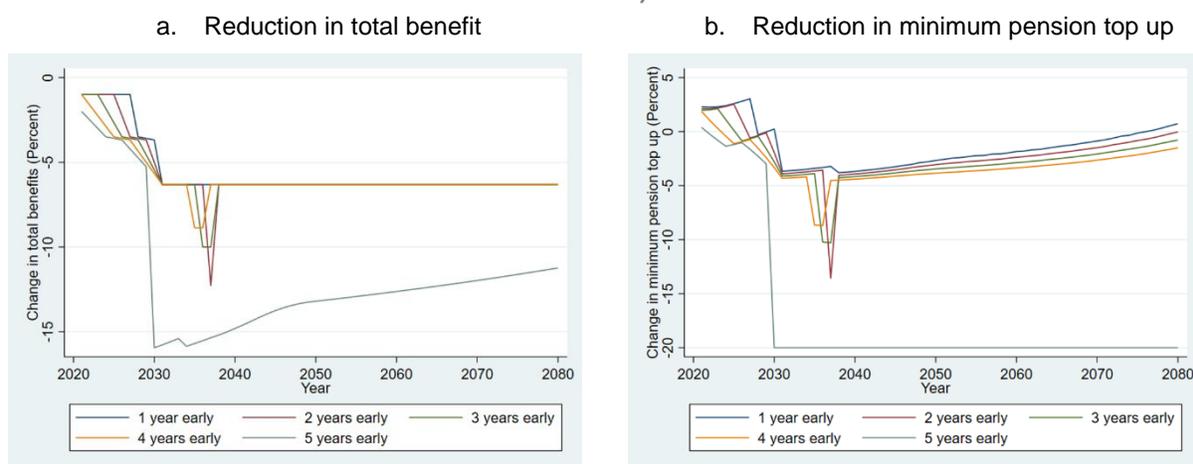
| a. Reduction in total benefit	b. Reduction in minimum pension top up

Source: author's calculations
Note: each observation represents one generation's retirement year. For instance, the observation 2030 is for the generations born between 1966-1970 for retirement of 1-5 years early respectively. Penalties are yearly (i.e., a 1 percent penalty for 2 years early retirement leads to a total penalty of 2 percent).

The minimum pension strongly encourages early retirement as minimum pension benefits barely increase with retirement age, despite the extra contribution time and lower expected duration of retirement. Looking at total pension benefits obscures the fact that higher minimum pension benefits for later retirement are partially paid for – or in some cases more than paid for –by own contributions. Funded DC benefits – if properly calculated – are actuarially neutral. For total benefits, including the minimum pension, to be actuarially neutral, the top up the minimum pension provides needs to be actuarially neutral (i.e., the green part in figure 18). If we only look at the minimum pension top up, the pattern changes. For the first few years, early retirement actually provides a bonus in terms of the top up (Figure 22b). Working one year longer increases the funds in the DC account (both because of additional contributions and additional returns) and therefore increases the pension benefits derived from the individual account. At the same time, working one year longer only results in a 1-1.5 percent (real) increase in minimum pension benefits. The increase in own funds exceeds the increase of the minimum pension, meaning that not only do own contributions and returns pay for the additional 1-1.5 percent, they also pay partially for minimum pension benefit entitlements that the individual was already eligible for the year before. This creates a big incentive to retire early, or to work the last few years in the informal sector. Eventually, from 2028 onwards, early retirement leads to penalties, albeit small, with the same long spikes downward because of the wage bracket interaction. However, in the very long run penalties will turn into bonuses again, once minimum pension top ups have become smaller and DC savings have become bigger because of increased contributions, positive real returns and positive real wage growth. The speed and extend at which penalties for early retirement become bonusses depend on real wage growth; the replacement rate of minimum pensions (as Figure 17 shows replacement rates are not all the same); cohort life expectancy and the difference between returns and wage growth. Only cohort life expectancy and potentially some measure of financial sector returns should feature in any penalty/bonus calculation. However, both should enter the penalty calculation directly rather than through the DC benefit formula as is currently the case.

For longer career the patterns observed above can be even stronger. One year of early retirement of for instance someone who contributed 25 years will almost consistently lead to a bonus in terms of the minimum pension top up, except for the year in which one year later retirement would lead to being included in a higher wage bracket (downward spikes, Figure 23). Eventually the bonusses become very big because the minimum pension top up becomes very small.

Figure 23. Reduction in the minimum pension top up for one year of early retirement (by career length)
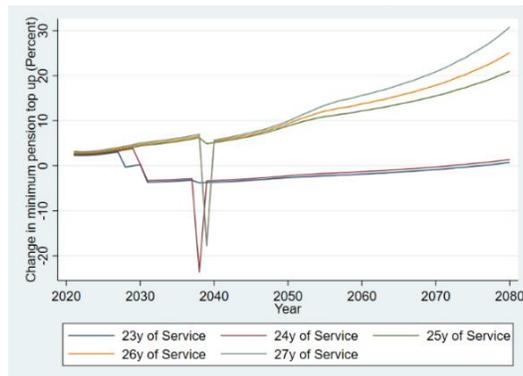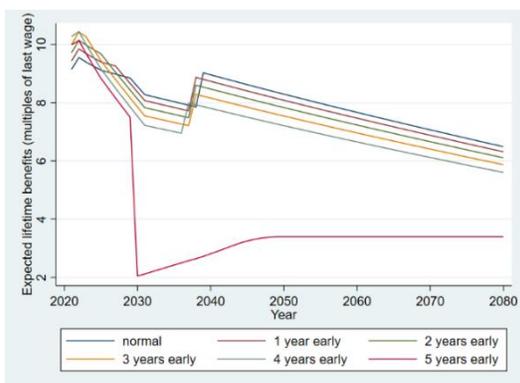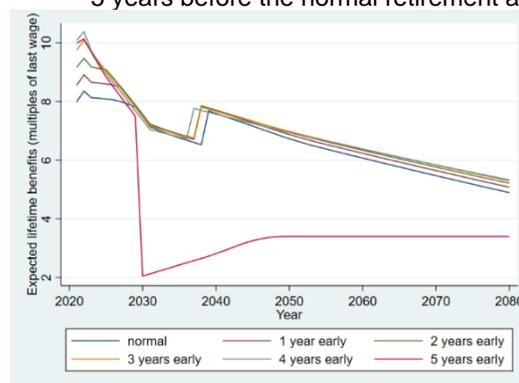

Source: author's calculations

Considering total benefits paid over remaining lifetime makes it clear that working longer does not pay off. Total expected benefits received from the time of retirement (discounted with inflation) starts around 10 times the last earned wage in 2020 falling gradually to 6 times the last earned wage around 2080 (Figure 24a). While the majority of the time the individual retiring at the normal retirement age receives a slightly higher total lifetime benefits, in some instances, retiring early actually leads to higher benefits. This is mostly the case early on, when years of contribution requirements start to rise. Looking at total benefits received, net of contributions made during the last 5 years before the normal retirement age – i.e., net of contributions made during the years in which retirement becomes possible – it becomes clear that the slightly higher total benefits are (more than) self-financed (Figure 24b). For almost all retiring generations, individuals retiring at the normal retirement age receive the lowest lifetime benefits net of contributions of the last 5 years. For most cohorts, retiring 4 years early is the optimal decision since this is the first year it is possible to retire on a minimum pension with 20 years of contributions.

Figure 24. Lifetime benefits (multiples of the last earned wage)

a. Total benefits received (19-24 year career) b. Benefits received net of contributions of last 5 years before the normal retirement age

Source: author's calculations
Note: career lengths range from 19 years (5 years early) to 24 years (normal retirement age). Benefits are discounted with inflation and expressed in multiples of the last earned wage.

Actuarial neutrality for early retirement on a minimum pension is difficult to determine. Establishing actuarial neutral penalties for a benefit that negatively depends on entitlements of potential future own contributions is impossible. Actuarial neutrality implies that at a given age (usually close to retirement) a worker is indifferent between working an extra year or not for a chosen discount rate. This means that the present value of accrued benefits should not be affected by working an additional year (i.e., benefits increase only by the additional entitlement earned in the following year(s)). Since funded defined contribution benefits are by definition actuarially neutral this means that for the minimum pension to be actuarially neutral, the top-up of the minimum pension also needs to be actuarily neutral. However, any top up will crucially depend on working an additional year or not, therefore contradicting the actuarial neutrality condition (see Annex III).[23] One way for individuals to take advantage of the system, is to work (some of) the additional years in the informal economy. This would maximize the minimum pension top up, while avoiding own contributions paying for (part of) the higher minimum pension.

Penalties on early retirement on a minimum pension are low. The OECD (2017) calculated that actuarial neutrality on existing entitlements implies a penalty between 5-6 percent for Mexico at the retirement age and that working one year more in Mexico (and therefore contributing one year more to the funded DC system) leads to a bonus of 7.4 percent. Since the funded system is by definition an actuarially neutral system this can also be seen as an approximation of an actuarially neutral penalty for working one year less. However, the penalty on the full minimum pension for retiring 1 year earlier ranges from 1.0 percent to 1.4 percent within each wage and career length bracket. This means that the total discounted value of pension benefits for retiring one year early increases. However, if retiring one year earlier also leads to ending up in two career length brackets lower (each bracket is 25 weeks) the penalty ranges from 6.0-7.5 percent, the upper end of which is closer to the implied actuarial neutral penalty.

IV. Conclusion and reforms options

In recent years the Mexican pension system has changed significantly. In 2019 the existing means-tested social pension was made universal and the benefit level increased, initially covering everyone over the age of 68 which was later lowered to age 65. In 2020, it was decided to increase contribution rates for the funded defined contribution system, lower minimum years of contributions needed to receive an earnings-related pension and increase minimum pensions.

The reforms of 2019 and 2020 of the Mexican pension system have some flaws. While the reforms smooth out some of the large differences in pension benefits between pre- and post-1997 labor market entrants,

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[23] One way to make minimum pensions actuarially neutral is to fix the top up at the earliest age of retirement and adjust in an actuarial way independent of any potential future additional entitlements to own pensions. However, this would defeat the purpose of a minimum pension (i.e., provide a top up for those with low entitlements as low entitlements should be determined at retirement).

adjustments should be made to keep the pension system fiscally sustainable, avoid crowding out of other spending needs, to iron out inconsistencies and inequities in the current design and to provide consistent and positive incentives to work longer. In a short time, a basic pension was introduced and made significantly more generous and multiple minimum pension levels were introduced, the majority of which are well above previous minimum pension levels and close to the old PAYGO pension benefits. This is likely to increase spending significantly, while there are urgent spending needs in other areas of social, health and education policy. The current design of the pension system leads to wildly different outcomes for relatively similar careers. Finally, incentives to work longer are weak because of low penalties on early minimum pensions, little differentiation of minimum pensions for career length and (still) high minimum years of contribution requirements.

The following policy options could be considered:

- Limit the increase of the basic pension while maintaining benefit coverage. A rapid increase in basic pension levels risk crowding out other urgent spending needs. Close to 100 percent coverage has only recently been achieved and should be maintained to make the basic pension effective.
- Abolish minimum contribution requirement for funded pensions. Instead implement a minimum balance requirement for phased withdrawals and annuities. Minimum contribution requirements are unlikely to lead to longer working lives. The reason not to convert every AFORE balance into an annuity or phased withdrawal is purely administrative. For some very low balances the administrative costs outweigh the advantages of receiving a stream of income. The more pension payments are automized the lower administrative expenses are (especially for phased withdrawals) and the lower this minimum balance requirement can be.[24]
- Abolish the minimum wage as separate government contribution bracket and as lower bound for the minimum pension. Since the delinking of social benefits from the minimum wage, the minimum wage has increased significantly in real terms. This leads to the collapse of contribution and earnings brackets and to a discrepancy between minimum wage earners and other low earners receiving a government subsidy. Instead express the minimum wage in terms of UMA like all other earnings levels and have an open ended lowest minimum pension bracket.
- Make redistribution within the pension system transparent and intentional. The Mexican pension system mixes redistribution through the basic pension, government subsidized contributions and elaborate minimum pensions. It's unclear why this many policy leavers are needed to achieve the objective of pension adequacy while limiting negative labor market effects. Especially redistribution through minimum pensions is opaque and leads to unintended outcomes. There are a few options to either eliminate these inefficiencies or at least limit them, some of these options can be combined (see Annex IV for numerical examples):
  - Option 1: Phase out the minimum pension. Minimum pensions often serve to reward long careers of lower earners. However, any career length requirement will create an arbitrary and inequitable cut off between those that just reach this requirement, and therefore receive this minimum pension, and those that almost reach it, but don't receive this minimum pension. The only fully equitable minimum pension would be fully pro-rated as is the case in France and Switzerland.

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[24] For instance, in the Netherlands pension entitlements that would lead to a pension of less than EUR 500 per year can be paid out as lump sum. This is equivalent to less than 1 percent of the average wage. However, the retiree can refuse the lump sum payment and request an annuity. Only pensions of less than EUR 2 a year are automatically paid out as lump sum.

However, at that point minimum pensions don't just serve the purpose of rewarding long careers, it instead serves the purpose similar to any social pension. In addition, low earners in Mexico are already subsidized through government contributions and redistribution and adequacy is enhanced by the introduction of the basic pension. A third form of redistribution is unlikely to add much value, especially if it has negative equity consequences. While a phase out, for instance by fixing the minimum pension levels in nominal terms, would not completely eliminate the design inefficiencies during the transition, it would limit the time these inefficiencies exist.

- Option 2: Simplify the minimum pension by abolishing differentiation between career earnings for the minimum pension. At the moment even relatively high earners would still receive a minimum pension. It's therefore advisable, over the medium term, to only maintain the current lowest career earnings bracket and apply this minimum irrespective of career earnings. This could be achieved by gradually letting higher earnings brackets converge to the lowest bracket, for instance by only indexing the lowest bracket while keeping higher brackets constant in nominal terms. Instead, to allow for more detailed differentiation, the minimum pension could be made fully proportional to career length only, removing some of the discrete steps (i.e., truly rewarding longer careers).

- Option 3: Enhance the current minimum pension by eliminating the threshold effects. If the link with career earnings is not abolished, at the very least express the minimum pension as a continuous function of average past earnings revalorized with economy-wide average wage growth and career length as described above (alternatively, both can be proxied simultaneously by DC balances or DC annuities).[25] Using wage revalorized past earnings would increase average wages, minimum pension levels and therefore spending. It would therefore be important to combine this with a downward adjustment of benefit levels.

- Option 4: Index earnings brackets with wage growth. While this would not eliminate all discontinuities, it would ensure that under stable macro-economic circumstances (as used in the simulations) similar careers receive similar minimum pensions. It would also lower the cost of the minimum pension over time. This could be combined with revalorizing past earnings with average wage growth, which would enhance stability of the minimum pension further, but would raise cost. A careful calibration is therefore necessary to balance equity, adequacy and fiscal sustainability needs.

- In all cases, early retirement on a minimum pension should be abolished and minimum pension benefit levels should remain price indexed. There is no way to make early retirement on minimum pensions equitable and to maintain work incentives. Instead allow minimum pension receipt only from the retirement age. One option would be to offer the possibility to defer the minimum pension after the retirement age. In this case the minimum pension top up should be determined at the normal retirement age and actuarially adjusted (i.e., irrespective of actual additional contributions to the funded pension system). Price indexation of minimum pensions is necessary to ensure the fiscal cost of the minimum pension doesn't perpetuate, causing a slow phase out of the minimum pension (i.e., when even the lowest DC balance eligible for a minimum pension, results in an annuity exceeding the minimum pension level).[26]

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[25] Taking DC balances or annuities into account would of course also capture investment returns. However, this would likely enhance the minimum pension by emphasizing the insurance element of the minimum pension.

[26] When this will happen depends on real wage growth, real returns and annuity factors.
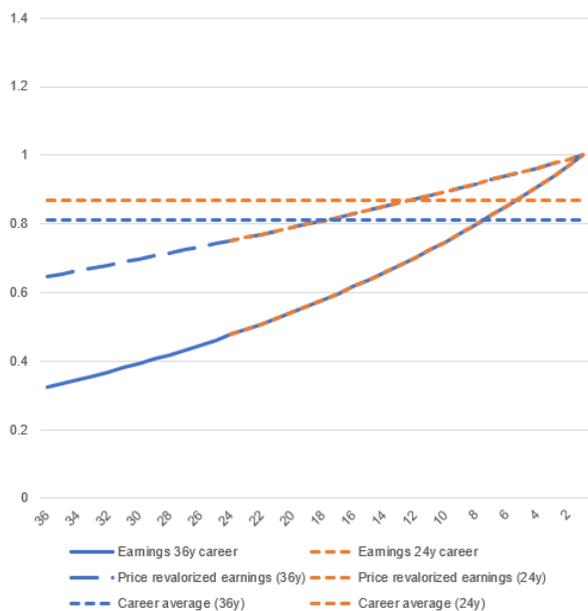
Annex I. Replacement rates

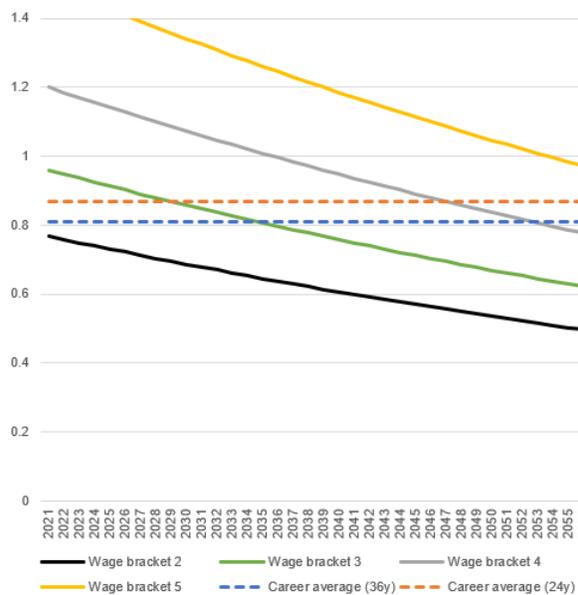Figure A1. Replacement rates (twice average wage earner)
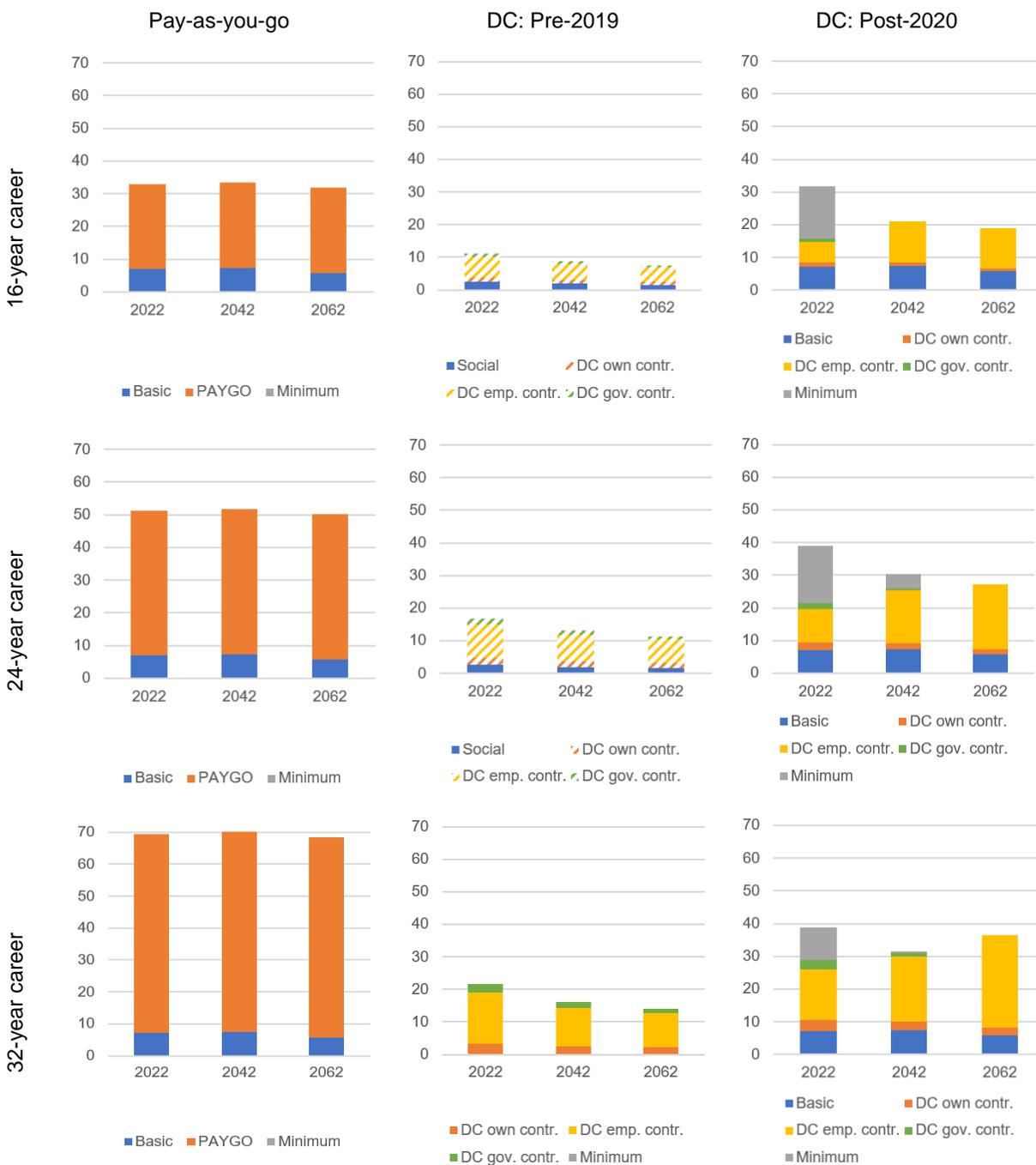
Annex II. Price uprating and bracket drift

Shorter careers of the same wage level have higher uprated average wages

Over time, the same wage curves will fall in higher income brackets of the minimum pension

Annex III. Actuarial neutrality

The DC part of the pension is actuarially neutral by definition. For the full pension to be actuarially neutral therefore the DC part and the minimum pension top up need to both be actuarially neutral independently.

Actuarial neutrality means that the discounted value of accrued benefits does not change by working an additional year:

$$PV_{A,t} = PV_{A+1,t}$$

This means that the present value of future benefit at age *A* at time *t* should be equal to the present value of benefits at age *A+1*. Both are calculated at time *t*. Someone receiving a minimum pension derives pension benefits from their own pension and from the top-up of the minimum pension. We can therefore express the discounted value of accrued benefits at a certain age as:

$$PV_{A,t} = PV_{A,t}^{DC} + PV_{A,t}^{M}$$

In which $PV_{A,t}^{DC}$ is the present value at age *A* at time *t* of all future benefits derived from the DC system. $PV_{A,t}^{M}$ is only the top up of the minimum pension (i.e., zero if someone's DC account is sufficient to buy an annuity that exceeds the minimum pension level).

Actuarial neutrality implies that:

$$PV_{A,t}^{DC} + PV_{A,t}^{M} = PV_{A+1,t}^{DC} + PV_{A+1,t}^{M}$$

In a well-functioning annuity market benefits derived from the DC system are by definition actuarially neutral. If someone with a certain DC balance waits one year to buy an annuity the present value of benefits shouldn't change. This means that for the full minimum pension to be actuarially neutral the top up should be actuarially neutral on its own:

$$PV_{A,t}^{M} = PV_{A+1,t}^{M}$$

The present value of benefits can be expressed as:

$$PV_{A,t}^{M} = \sum_{i=t} \frac{b_i s_i}{(1+r)^{i-t}}$$

Taking into account indexation we can express this as:

$$PV_{A,t}^M = b_{A,t} \sum_{i=t} \frac{(1+i)^{i-t} s_i}{(1+r)^{i-t}}$$

The present value of a benefit one year later can be expressed in largely the same way:

$$PV_{A+1,t}^M = b_{A+1,t} \left[\sum_{i=t} \frac{(1+i)^{i-t} s_i}{(1+r)^{i-t}} - 1 \right]$$

The minus one reflecting that no benefit is received at time t, that mortality at time t is zero (i.e., survival until time t is a given) and that no discounting is necessary at time t.

The top-up can be expressed as:

$$b_{A,t} = M_{A,t} - b_{A,t}^{DC}$$

$$DC_t = b_{A,t}^{DC} \sum_{i=t} \frac{(1+i)^{i-t} s_i}{(1+r)^{i-t}}$$

$$b_{A,t}^{DC} = \frac{DC_t}{\sum_{i=t} \frac{(1+i)^{i-t} s_i}{(1+r)^{i-t}}}$$

Not working

The top-up a year later, of a person who doesn't work at time t, is:

$$b_{A+1,t} = M_{A+1,t} - b_{A+1,t}^{DC}$$

$$DC_{t+1} = b_{A+1,t+1}^{DC} \sum_{i=t+1} \frac{(1+i)^{i-t-1} s_i}{(1+r)^{i-t-1}}$$

Which can be rewritten as:

$$DC_t(1+r) = b_{A+1,t+1}^{DC} \frac{(1+r)}{(1+i)} \left[\sum_{i=t} \frac{(1+i)^{i-t} s_i}{(1+r)^{i-t}} - 1 \right]$$

$$DC_t = b_{A+1,t}^{DC} \left[\sum_{i=t} \frac{(1+i)^{i-t} s_i}{(1+r)^{i-t}} - 1 \right]$$

$$b_{A+1,t}^{DC} = \frac{DC_t}{\left[\sum_{i=t} \frac{(1+i)^{i-t} s_i}{(1+r)^{i-t}} - 1 \right]}$$

This means:

$$PV_{A,t}^{M} = \left[M_{A,t} - \frac{DC_t}{\sum_{i=t} \frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}}} \right] \sum_{i=t} \frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}}$$

$$PV_{A,t}^{M} = M_{A,t} \sum_{i=t} \frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} - DC_t$$

And

$$PV_{A+1,t}^{M} = M_{A+1,t} \left[\sum_{i=t} \frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} - 1 \right] - DC_t$$

If actuarial neutrality holds ($PV_{A,t}^{M} = PV_{A+1,t}^{M}$):

$$M_{A,t} \sum_{i=t} \frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} = M_{A+1,t} \left[\sum_{i=t} \frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} - 1 \right]$$

This means that the actuarial adjustment for the minimum pension needs to be:

$$M_{A+1,t} = \frac{\sum_{i=t} \frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}}}{\sum_{i=t} \frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} - 1} M_{A,t}$$

Working

The top-up a year later, of a person who works at time t, is:

$$b_{A+1,t} = M_{A+1,t} - b_{A+1,t}^{DC}$$

$$DC_{t+1} = b_{A+1,t+1}^{DC} \sum_{i=t+1} \frac{(1+i)^{i-t-1}s_i}{(1+r)^{i-t-1}}$$

Which can be rewritten as:

$$DC_t(1+r) + cw_t(1+r) = b_{A+1,t+1}^{DC} \frac{(1+r)}{(1+i)} \left[\sum_{i=t} \frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} - 1 \right]$$

$$DC_t + cw_t = b_{A+1,t}^{DC} \left[\sum_{i=t} \frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} - 1 \right]$$

$$b_{A+1,t}^{DC} = \frac{DC_t + cw_t}{\left[\sum_{i=t}\frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} - 1\right]}$$

This means:

$$PV_{A,t}^{M} = \left[M_{A,t} - \frac{DC_t}{\sum_{i=t}\frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}}}\right]\sum_{i=t}\frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}}$$

$$PV_{A,t}^{M} = M_{A,t}\sum_{i=t}\frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} - DC_t$$

And

$$PV_{A+1,t}^{M} = M_{A+1,t}\left[\sum_{i=t}\frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} - 1\right] - DC_t - cw_t$$

If actuarial neutrality holds ($PV_{A,t}^{M} = PV_{A+1,t}^{M}$):

$$M_{A,t}\sum_{i=t}\frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} = M_{A+1,t}\left[\sum_{i=t}\frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} - 1\right] - cw_t$$

This means that the actuarial adjustment for the minimum pension needs to be:

$$M_{A+1,t} = \frac{\sum_{i=t}\frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}}}{\sum_{i=t}\frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} - 1}M_{A,t} + \frac{cw_t}{\sum_{i=t}\frac{(1+i)^{i-t}s_i}{(1+r)^{i-t}} - 1}$$

Which means that the actuarial neutral level of the minimum pension is not the same for working and non-working people. The second element in the equation reflect the added benefit in the DC system of working and contributing one more period.

The issue is of course that at time t it is unclear if someone will work or not. One could take an expected value of cw_t which will likely involve the employment rate of a specific subgroup of the population $ce_{A,t}w_{A,t}$ (i.e., people of a certain age and a certain work history). However, the problem is that the decision to work will be influenced by the payoff of that work. While the direct payoff remains the same (i.e., a wage in period t) the payoff for the next period is zero in most occasions – the minimum pension level remains the same – unless they move into the higher minimum pension bracket. This means that past observations of work are likely an

unreliable indicator for the probability of work. If people only take into account pension payoff, the expected level of employment will fall to zero. This means that $M_{A+1,t}$ converges to the value of the previous section. It also means that there is a strong disincentive to work.
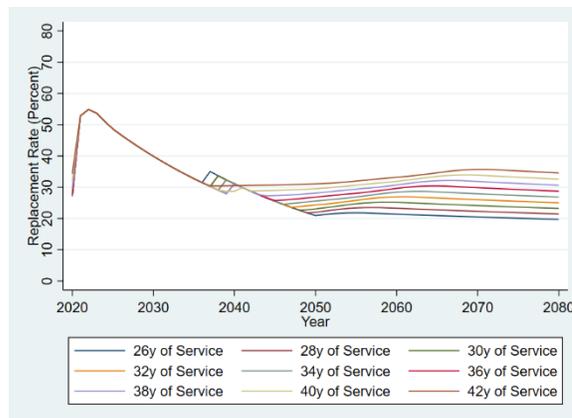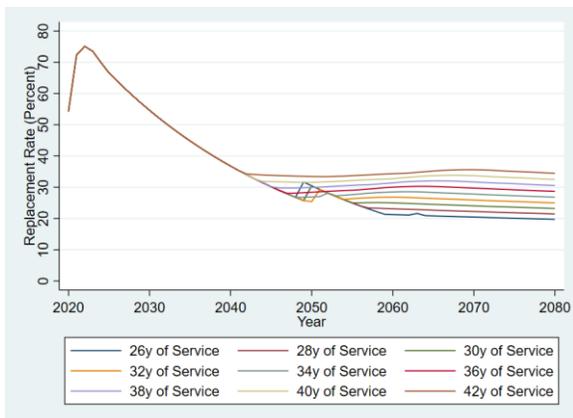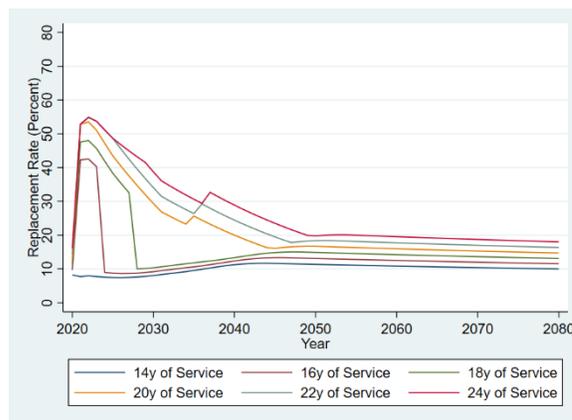
Annex IV. Reform options outcomes

In this annex a few reform options are simulated. These simulations are for informative purposes only. The exact calibration of parameters should be carefully investigated on a micro level (i.e,, distributional effects) and a macro level (i.e., spending effects).

Option 1. Phase out minimum pension
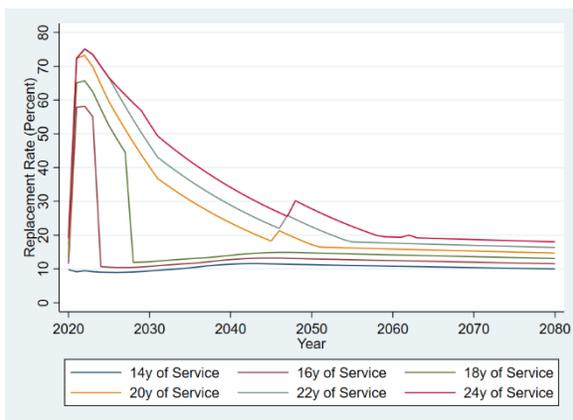
Half average wage   Average wage

Assumption: keep minimum pension levels constant in nominal terms

Options 2. Eliminate earnings-brackets
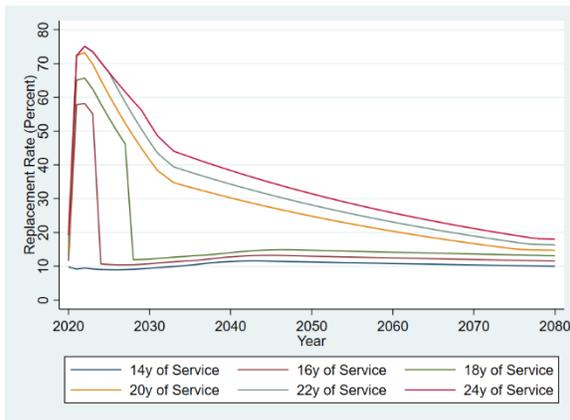
Half average wage   Average wage
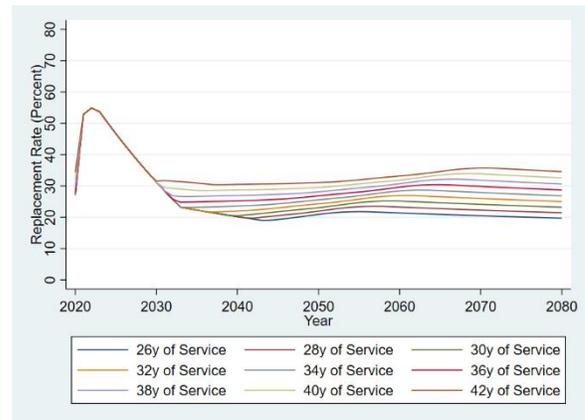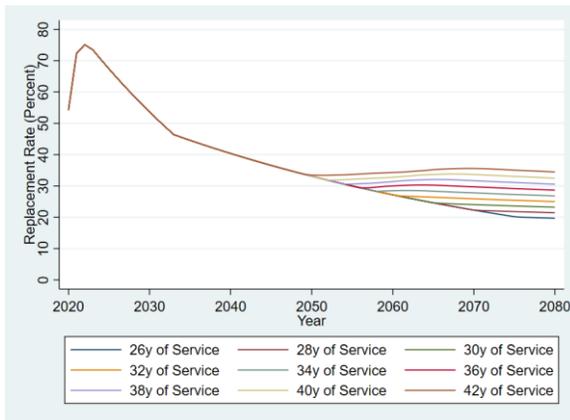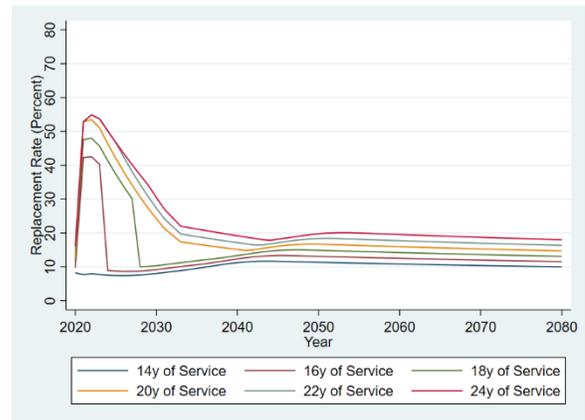
Assumption: let earnings brackets converge to lowest earnings bracket over a period of 10 years.

Option 3. Eliminate threshold effects
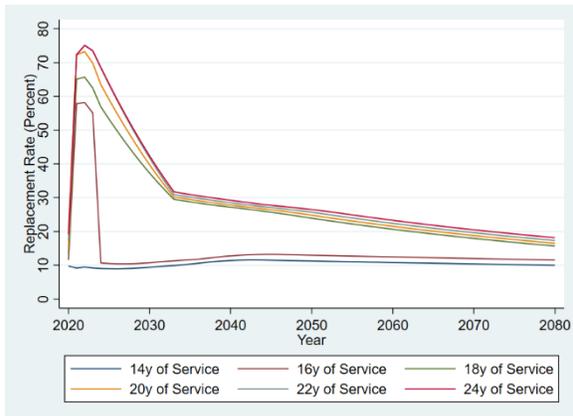
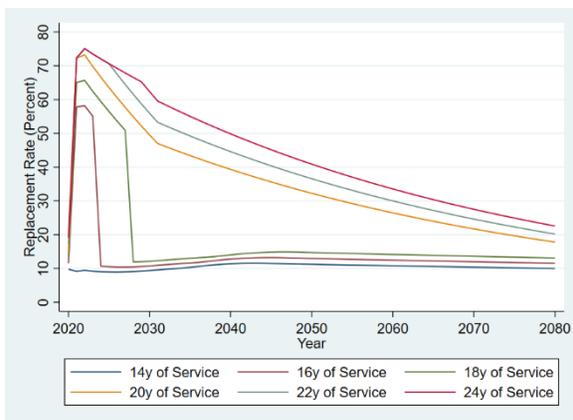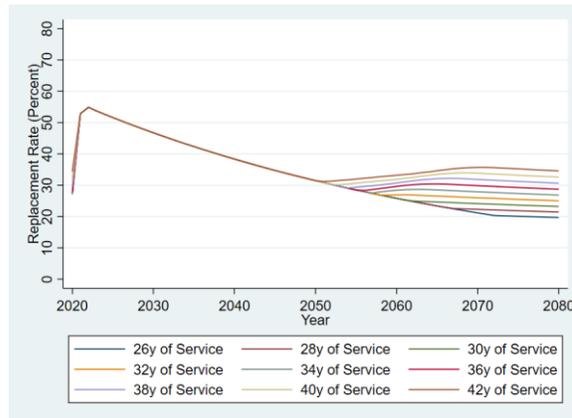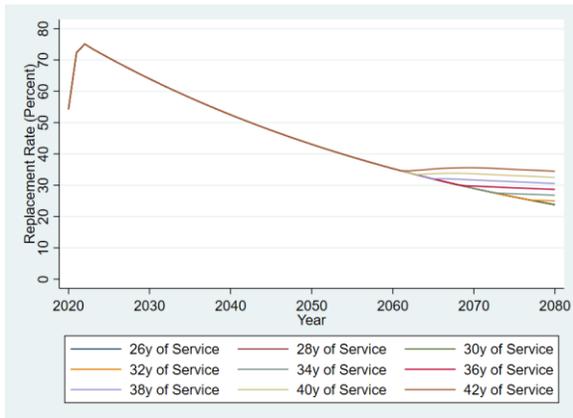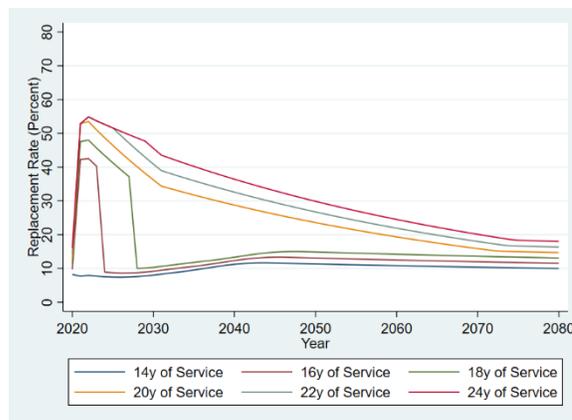Half average wage   Average wage
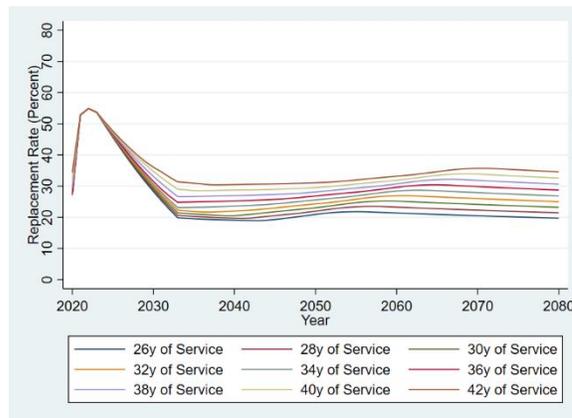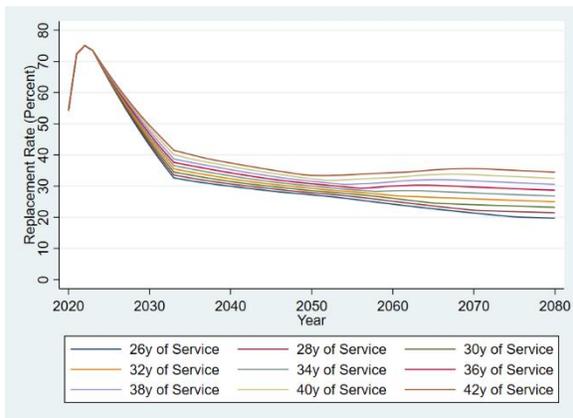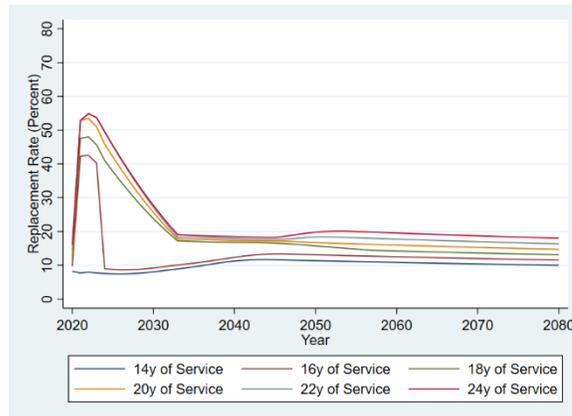
Assumption: new minimum pension is 50 percent of lowest minimum pension, withdrawn at a 50 percent rate against own pension income. Gradual conversion to new rules over 10 years' time. Career length requirements frozen in 2024.

Option 4. Index brackets with wage growth

Half average wage   Average wage

Assumption: Brackets are indexed with average wage growth after 2024. Career average earnings gradually converge to average wage uprated earnings over a period of 10 years.

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