The impact of IMSS pensions on Mexico's public finances

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Abstract: **The importance of the insured members of the Mexican Social Security Institute (IMSS) can be appreciated because it has 20.6 million members as of December 2021, which represent 83.5% of formal employment in Mexico. Pensions and retirements under the transition regime of IMSS Law 73 (defined benefit) are becoming one of the main problems facing national public finances. The liabilities of the Mexican Social Security Institute (IMSS) in its IMSS-employer modality correspond to the equivalent of 11.9% of the GDP for the year 2021, while those of the IMSS-insurer is 44.1% of the GDP, adding both modalities, they reach 56% of the GDP. According to actuarial calculations, the maximum point of public spending for pensions under the transition regime (defined benefit) will be reached in 2035. The replacement rate of a worker affiliated to the IMSS who contributed under Law 97 (capitalization regime) was only 25%; with the reforms made in December 2020, it is estimated that the replacement rate will reach 60%. By the year 2019, the retirement fund administrators in Chile had resources equivalent to 80.8% of GDP; Uruguay 29.1%; Colombia 24%; Peru 22.8%; and Mexico 16.4% of GDP, which is a very low indicator compared to Latin American nations.**

***Keywords*: pension; social security; retirement; define benefit; retirement; fund administration**

I. INTRODUCTION

This paper analyzes the impact of the pensions of the Mexican Social Security Institute (IMSS) on national public finances. It has been recognized for many years that the existence of public resources is always limited in any economic activity, whether private or public, and in order to achieve social security in Mexico, many more resources are being distributed than were contemplated in previous years in the federal public budget, especially in the area of pensions.

July 1, 2021 marked the 24th anniversary of the 1997 reforms to the Social Security Law, which makes it necessary to digress and explain what has happened to the workers affiliated to the IMSS in terms of their retirement contributions. Also this year, the first pensions that came out of the IMSS regime of Law 97 began to appear, counting from January 1 to December 15, 2021, with 27,396 workers who accessed their pensions through the Retirement Fund Administrators (AFORE).

The IMSS reforms in 1997 sought to solve the institution's financial problems by sharing the risk with the worker through savings in individual accounts, but they achieved this to a very limited extent, and as time went by, problems in pension financing reappeared, As a result, few workers would be able to retire in their old age with decent and acceptable pensions, where the majority would be within the minimum guaranteed pension of one minimum wage, as long as they had had the 1250 weeks required by the Social Security Law before the reforms of December 2020.

In the first part of this paper is contemplated to the theoretical and conceptual framework of social security and pensions in general, giving some figures of the most important indicators of these concepts. In the second part is discussed the impact on public finances of the pensions of IMSS workers, which I will henceforth refer to as IMSS-Patron.

In the third part of this presentation I analyze the role of private sector workers in Mexico's pension systems, who are in formal employment and are insured by the IMSS, which I will hereafter refer to as IMSS-Insurer. It is worth mentioning that 83.2% of Mexican workers who are formally employed and entitled to contributory social security are concentrated here, which makes their importance very high in the study of the nation's social security systems and pension schemes.

II. DEVELOPMENT OF THE TOPIC

At present, social security has become one of the main axes of the public policies of the State, where it is intended to increase the levels of welfare of the population. It should not be forgotten that social security is established as a human right, foreseen in articles 22 and 25 of the Universal Declaration of Human Rights of the United Nations approved and proclaimed in December 1948, which on April 28, 1988 the Mexican State signed it, obliging itself to respect it within its territory.

In addition to favoring a human right, social security and protection is essential to promote the economic, social and human development of people, regions and nations, which is why it should become a priority for the economic policies implemented by the Mexican State, where the main challenge should be to increase the generation of jobs in the formal sector of the economy.

In this way that social security becomes a human right that the State must enforce, where article 25 of the Universal Declaration of Human Rights (ONU, 1948) states that people have the right to health, disability, widowhood and old age insurance. In this way, pensions become an inalienable right for workers.

The Auditoría Superior de la Federación (ASF) -Superior Audit Office of the Federation- (2020: 2) points out this definition: "Social security is the set of public measures aimed at protecting the population against economic and social privations derived from reductions or loss of income due to circumstances such as illness, work accidents, unemployment, disability, old age and death".

For his part, A. Deaton (2015; cited by Columna, 2021: 13) states on the subject: "...social security constitutes the center of the social, and indeed also economic, policy agenda of modern governments. Social security is a powerful resource to try to equalize outcomes and to guarantee the rights of the less privileged members of our societies".

Although in the opinion of Marquet Guerrero (2019: 236) there is a preponderance in using the term social protection instead of social security, where international institutions such as the United Nations (UN) and the International Labor Organization (ILO) have been using the concept of social protection, in addition to the fact that the term social security gives the idea of insufficiency to be able to cover some less favored or poor population strata, adding in this regard: "In this order of ideas we can conclude that the expression social protection, although it has similar objectives to those of social security, conceptually exceeds the limitations of the latter, particularly because it seeks to regulate systems of protection for every person by the mere fact of being human".

Theoretical and conceptual framework of pensions

Pensions are defined as the amount of money received by the worker or his family at the end of his working life, which may be for disability, death, orphan or unemployment and old age, the latter being paid when the worker reaches 60-65 years of age and when he has 30-35 years of service, in addition to having made contributions to the social security systems.

The terms pension and retirement are often used as synonyms, when they have some differences, as Villalobos López (2021:1) states: "The fundamental difference between pension and retirement lies in the fact that the former will not receive the benefit directly from the employer, but through a common fund or mass that accumulated during his working life, while the latter implies that the employer who delivers the benefit will be the one to whom he served during his productive life".

In terms of financing, a distinction must be made between two types of pensions: contributory and non-contributory. Contributory pensions require workers to be or to have been formally employed and to pay social security contributions. Non-contributory pensions basically correspond to subsidies or transfers granted by the State to people who did not have jobs in the formal sector of the economy.

In turn, contributory pensions are divided into two major systems or regimes: a) defined benefit; and b) defined contribution. In the defined benefit system, workers' resources will be accumulated in a common fund, which at the end of their productive life will entitle them to receive a secure income until their death, where the State will guarantee such income; while in the defined contribution or individual capitalization system, each worker collects his contributions, which will be capitalized in the future and at the end of his working life he will receive an income, the amount of which is unknown and where the State does not intervene (Alanís & Soto, 2020: 40).

For the Organization for Economic Cooperation and Development (OECD, 2016: 30) the Mexican pension system is composed of four components: 1) The federal and state non-contributory social pension schemes (pillar zero); 2) The mandatory defined contribution Retirement Savings System (SAR); 3) Special pension schemes for state employees and public universities; and 4) Voluntary individual pension plans.

It should be reiterated that under the scheme of Law 73 (transitional regime), pensions were in charge of the federal government, so that every year public resources are allocated to meet these obligations, which are regulated by national norms and laws.

According to access to social security in Mexico, Alanís Gutiérrez & Soto Esquivel (2020: 44) classify it into these groups: 1) Not affiliated to contributory pension systems 55% of the economically active population (EAP); 2) Affiliated to the IMSS 33% of the EAP, concentrating the majority of the population with access to social security and divided according to the application of laws 1973 or 1997; 3) Public servants and university workers 12% of the EAP. As we can see, 45% of the country's workers were under the contributory pension system.

In more recent information, according to the Occupation and Employment Survey (ENOE) conducted by the Instituto Nacional de Estadística, Geografía e Informática (INEGI) -National Institute of Statistics, Geography and Informatics- (2022: 4), as of December 2021, Mexico had 56.9 million employed Economically Active Population (EAP), of which 24.8 million are formally employed (43.5%) and 32.1 million are informally employed (56.5%).

By 2021, of the 24.8 million with formal employment, 20.6 million were contributing to the IMSS (Tableau Public, 2022), representing 83.2% of the total number of people with formal employment in the country as of December 2021.

The El Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL) -National Council for the Evaluation of Social Development Policy- (2020: 25) in 2018 gives these data on contributory and non-contributory pensions:

- With contributory pension: 3.2 million people, which represented 30.9% of the older adult population (over 65 years old), of which 0.6 million people, 18.4% of this regime, were in poverty.
- With non-contributory pension: 4.5 million people, 43.2% of the elderly population, and of these 2.3 million people were in a situation of poverty, 50.7% of the non-contributory pensioners for the elderly program.
- Without pension: 3.2 million people, representing 30.4% of the elderly population, of which 1.5 million people were in poverty, 47.6% of those without pension.

With these data it can be inferred that 4.4 million Mexicans over 65 years of age in Mexico were in a situation of poverty, according to the data provided by CONEVAL.

In a similar data, Mesa Lago (2020: 29-30) points out that in Mexico, the contributory pension system represented 32.7% in 2010 of the total EAP, while in 2018 it meant 29.6% in the country, compared to countries such as Uruguay it reached 70.6%, Costa Rica 67.4% and Chile 65.3% in 2018, large differences with Mexico as seen in the percentages related to contributory pensions.

The International Labor Organization recommends that at least 50% of the population should have a contributory pension, so that with 42% we are still 8 percentage points away from achieving that goal, still far away and it will not be reached as long as more than 58% of the Mexican population is immersed in the informal economy or worse is unemployed.

In addition, Mesa Lago (Idem) points out that in Mexico the coverage of all types of pensions (contributory and non-contributory) represented 50.1% in 2010 of the population over 65 years of age in the country, representing 75% in 2018, while in countries such as Chile it represented 88.9%, Uruguay 86.8% and in Panama 80.8%, which shows that in these three Latin American countries the vast majority of their population is protected by a pension of any type in 2018. In Mexico, progress was made to cover from half to three quarters of the elderly in eight years, an advance generated by the non-contributory pension for the elderly.

Until before the December 2020 reforms, Lagarda Cuevas & Mandujano Canto (2017: 106) mention that out of every 100 people who started their working career in formality and transitioned to a non-protected (informal) sector, only 44 people returned to a job with some social security benefit, which implies that by 2035 50% of the population will start their old age with 24% of their last income as annuity, with this they would receive 24 pesos for every 100 pesos they received in salary.

Defined benefit pensions are financed by general public contributions that affect national public finances, bringing benefits only to those who work in the formal market and are closely related to higher income groups and therefore tend to be considered regressive (Moreno et al, 2017: 70).

Regarding Retirement Fund Administrators (AFORE) in our country there were 14 in 1998; 12 in 2003; 21 in 2008; 12 in 2013; 11 in 2017 (López & Aguilar, 2018:1543-1544). As of February 2022, there are ten administrators: 1) AFORE Azteca; 2) Citibanamex AFORE; 3) AFORE Coppel; 4) Fondo Nacional de Pensiones para los Trabajadores al Servicio del Estado (PENSIONISSSTE); 5) AFORE Inbursa; 6) AFORE Invercap; 7) Principal AFORE; 8) Profuturo AFORE; 9) AFORE SURA; and 10) AFORE XXI Banorte (CONSAR, 2022b).

The two largest AFOREs in Mexico concentrated 43.1% of the funds in 2004 and 39% in 2019. In 2019, the retirement fund managers of some Latin American countries, according to Mesa Lago (2020: 62), mention their amount in dollars and their years of operation:

Henceforth, quantities will be expressed using the long scale system used in continental Europe and Central and South America. (One billion equals 12 zeros).

- Chile accumulates 215.4 thousands of millions, 80.8% of its GDP and with 38 years of operation.
- Mexico accumulates 211 thousands of millions, 16.4% of GDP and with 22 years of operation.
- Colombia has 76.1 thousands of millions, 24% of GDP and 25 years of operation.
- Peru accumulates 52.3 thousands of millions, 22.8% of GDP and with 26 years of operation.
- Uruguay has 15.1 thousands of millions, 29.1% of GDP and 23 years of operation.

In relation to the accumulated funds of the pension fund managers, the Latin American countries I have mentioned present better figures than Mexico, the one with the lowest 22.8% of the GDP being Peru, while Mexico barely reaches 16.4% of the GDP in 2019.

Although it should be recognized that the World Bank (2017; cited by Alanís & Soto, 2020: 44) points out the growth that the assets of the pension system in Mexico have had, since in 2000 they represented 2.55% of GDP, while in 2016 they came to represent 14% of GDP, however as a comparative data the assets of the pension system in Chile went from 49% to 69% of GDP from 2000 to 2016, where it is evident that the lack of work and informality have affected Mexico to achieve more resources.

According to the most recent information available, as of December 2021 the Comisión Nacional del Sistema de Ahorro para el Retiro (CONSAR)–National Commission of the Retirement Savings System- (2022) indicated that there were 70 million accounts managed by the Retirement Saving System in Mexico managing 5.2 billion pesos, representing 31.39% of the total assets of the Mexican financial system and 20.5% of GDP, growing by more than 6.5 percentage points of GDP in five years (from 2016 to 2021), a substantial achievement without a doubt. The average balance of the accounts is $96,437 pesos as of December 2021, achieving a nominal annual return rate of 11.15% and in real terms of 5.35% (CONSAR, 2022).

Another major problem of the AFOREs in Mexico today is that the number of active members in their accounts is decreasing over the years; in 1999, 60.2% of the accounts had movements, in 2001, 44.7% of the accounts were active, in 2003, 39. 3%, and in 2019 only 31.5% of the accounts had continuous movements (Mesa, 2020: 59), while in other Latin American countries workers' accounts are active and with movements in 57.5% in Uruguay, 56.6% in Costa Rica and 55.6% in Chile in 2019.

In relation to the replacement rate Oliver Azuara et al (2019: ii-iii) estimate that the rate is around 44% in the AFORE system in our country (law 97), assuming that 100% contribution densities are impossible in the current Mexican labor market, however for workers of the transition generation (law 73) and who contributed at least once to the previous benefit system the replacement rate is equivalent to 107%.

For the OECD (Bank of Mexico, 2021: 1) the replacement rate "is defined as the monthly amount of the pension as a percentage of the average salary received during the worker's working life".

The replacement rate is the percentage of the last salary that is incorporated as part of the pension or retirement, for example, a person with a salary of 200 pesos per day, with a replacement rate of 29.5% would obtain a pension of 59 pesos per day, while if he/she had a replacement rate of 107%, he/she would obtain a pension of 214 pesos per day.

On the Mexican pension reform of December 2020, in relation to the replacement rate (TR), Mesa Lago (2020: 133) reflects: “FIAP's –International Federation of Pensions Fund Administrators- proposal to improve TRs is to increase contributions, although I have not seen so far an actuarial study showing that such an increase achieves the minimum TR; in fact, the 2020 Mexican proposal in Congress (so far not supported by a published actuarial study) is for a TR of 40% or five points below 45%”.

The OECD (2019) indicates that in 2015 public spending on pensions corresponded to 2.3% of GDP in Mexico, while in European countries such as Italy it represents 16% of GDP, highlighting that in our country more than half of people in old age have no possibility of obtaining a contributory pension. The population of the Netherlands assures good pensions in old age, since private or funded pensions represent 5.8% of that nation's GDP, compared to 1.3% of Italy's GDP with private pensions. Here we see two European nations that provide excellent contributory pensions to their retired workers, one based on the use of private pensions and the other with public pensions.

Continuing with the European countries, most of them determine the pension based on the number of years of contribution and having worked previously to qualify for it. The countries that require the highest number of years worked to obtain a full pension are: United Kingdom with 49 years for men and 44 for women; Ireland 48 years; Belgium 45 years for men and 40 for women; Luxembourg, Portugal and France 40 years worked (López & Aguilar, 2018: 1550).

I take up some data from the table of Cigarroa Ríos et al (2021: 6) dealing with a comparative of the retirement regime of several countries:

- ❖ Germany: pay-as-you-go regime of individual plans, reformed between 2007 and 2009, estimates are 9.6% in equal fractions for company and worker. Retirement age: 67 years.
- ❖ Chile: voluntary and privately operated contributory pay-as-you-go system, modified in 1981, where the estimates are 10% and at least 20 years of contributions are required. The retirement age for men is 65 and for women 60.
- ❖ Spain: defined contribution system, modified in 2011, requiring at least 15 years of contributions. The retirement age is 65 years with 35 years of service and 67 years with 38 years of service.
- ❖ United States: OASDI multi-base regime (SEP and 401-KIRS), where the employer contributes 25% and the worker contributes 50% of the contribution. At least 10 years of contributions are required and the retirement age is between 65 and 67 years.

In Latin American countries, public pension expenditure in relation to GDP represents in 2017: 7.3% in Costa Rica; 10.7% in Uruguay; 4.5% in Colombia; 2.7% in El Salvador; 3.1% in Chile; 1.6% in Peru; and 3.1% in Mexico; while the average of these countries is 4.7% (Mesa, 2020: 71).

According to the analysis made to the Public Account, within the Federal Expenditure Budget, among the main programs concerning pensions in the nation locate:

- J006: Support for ISSSTE Pension Payroll Deficit; J008: Pensions and Retirements in Course of Payment; J009: Civilian Military and Grace Pensions; J011: Statutory Contributions to Retirement Insurance, Unemployment at Advanced Age and Old Age; J012: Social Quota Retirement Insurance, Unemployment, Age at Advanced Age and Old Age; J017: IMSS Retirement Reserve Fund; J021: IMSS Minimum Guaranteed Pension; J022: ISSSTE Retirement Insurance Social Contribution; J025: Provisions for pensions of Luz y Fuerza del Centro; J026: Provisions for the Payment of Pensions of Retirees of Ferrocarriles Nacionales de México.

From these ten items mentioned, I have derived a table of the last few years in relation to the budget exercised.

Table1. Public Spending on Pensions in Mexico. Millions of pesos

Institution	2018		2019		Grow	2020		Grow
IMSS-insurer	307,895.9	5.3%	352,675.8	6.1%	14.5%	390,517.4	6.5%	10.7%
IMSS-minimum pension	2,518.0	0.0%	3,939.7	0.1%	56.5%	4,373.4	0.1%	11.0%
ISSSTE	210,968.5	3.6%	228,637.3	3.9%	8.4%	244,164.2	4.1%	6.8%
IMSS-employer	84,741.1	1.5%	98,332.3	1.7%	16.0%	103,925.3	1.7%	5.7%
CFE	39,534.3	0.7%	41,261.5	0.7%	4.4%	44,189.5	0.7%	7.1%
PEMEX	56,144.9	1.0%	54,886.0	0.9%	-2.2%	63,143.1	1.1%	15.0%
LyFC	20,070.0	0.3%	20,756.6	0.4%	3.4%	21,122.9	0.4%	1.8%
Ferrocarriles Nacionales	2,687.3	0.0%	2,676.2	0.0%	-0.4%	2,644.2	0.0%	-1.2%
ISSFAM: Military	27,594.9	0.5%	30,493.6	0.5%	10.5%	33,059.7	0.6%	8.4%
Total Pensiones	**752,154.9**	**13.0%**	**833,659.0**	**14.3%**	**10.8%**	**907,139.7**	**15.1%**	**8.8%**

Source: Own elabortion, with information from the Public Account 2018, 2019 y 2020. Analytical Statement Funcional-Programmatic Clasification. Volume II, VII y VIII

I will be analyzing the table in detail later, now I can comment that the public expenditure exercised in national pensions was equivalent to 13%, 14.3% and 15.1% in 2018, 2019 and 2020. In addition, it is appreciated that the growth of pension spending was 10.8% for 2019 and 8.8% in 2020. This point that I highlight tends to put even more pressure on national public finances, since in some way this type of social security, which is unavoidable for the State, must be financed. Total public spending on pensions represented 3.34%, 3.35% and 3.92% of GDP in 2018, 2019 and 2020 respectively.

The Superior Audit Office of the Federation (ASF, 2016; cited by Azuara et al, 2019: 29) points out that until 2035 the last individual of the transition generation will retire, going from representing pensions 3.5% of GDP in 2017 to representing 5.7% in 2030, which is a very strong pressure on public finances and represents 92% of the revenue collected by Impuesto al Valor Agregado (IVA) -Value Added Tax- in 2017, in addition to the fact that this situation will last at least fifteen years affecting federal public spending.

Azuara et al (2019: 27-28) provide information from the Centro de Investigación Económica y Presupuestaria (CIEP) – Center for Economic and Budgetary Research- showing that total public spending dedicated to pensions:

- In 2016 was 729,482millionpesos, where they include pensions from the three pillars: Pillar 1 (defined benefit) absorbed 82.3%; Pillar 2 (defined contribution) 1.17%; and Pillar 0 (non-contributory or senior citizens program) 6%. As a result, total pension spending in the country represented 13.9% of total public spending and 3.3% of GDP in 2016.
- In 2017, 781,324 million pesos were exercised, divided into the three pillars. Pillar 1: 83.1%; Pillar 2: 1.2%; and Pillar 0: 5.0%. Spending exercised on pensions accounted for 14.9% of total federal public spending and 3.53% of GDP in 2017.

In similar information, Mesa Lago (2020: 71) describes that in Mexico pension spending represented 1.4% of GDP in 2000 and 3.1% of GDP in 2017, presenting a growth of 6.8% in this period, while the national GDP grew on average 2.2% in the same period. This shows the high dynamism of public spending on pensions and the pressure it puts on national public finances, growing by 4.8 percentage points annually during those 18 years.

In reference to the total magnitude of national liabilities for labor pensions, two different sources pointed out by Vargas Mendoza (2019; 65) make us see the amount that such resources reach of the total national product:

- Valuaciones Actuariales del Norte –Northern Actuarial Valuations- in 2018 specifies that the total amount of pension payment obligations of the three orders of government in Mexico is equivalent to 1.4 times the country's GDP.
- The Superior Audit Office of the Federation stated that by 2013, national pension liabilities represented 17.5 billion pesos, representing 1.32 times the GDP, which is why they become the most serious financial problem of the Mexican government's public spending policy.

The Superior Audit Office of the Federation (ASF, 2020: 107) points out in relation to the amount of labor pension liabilities in the country, warning that it is necessary to take into account the workers of PEMEX's transitory regime, stating in this regard: “It was identified that, in 2018, the present value of pension obligations (17,025,062.7 million pesos), represented 72.3% of the Gross Domestic Product (23,542,737.2 million pesos), equivalent to 3. 0 times the net budgetary expenditure paid (5,611,559.1 million pesos), 5.6 times tax revenues (3,062,331.4 million pesos) and 28.6 times the net indebtedness of the budgetary public sector (595,780.6 million pesos)”.

Columna Franco (2021: 89) projects a micro-simulation model regarding Mexico's future thinking, pointing out that in 2033 the largest outlay of public finances to face the pension issue will be reached, emphasizing in his conclusions: “Therefore, this budget will have to come from somewhere and, given the commitments of the last federal governments, there is no fiscal reform in sight that would contribute to relieve the fiscal burden. These resources will come from other items, discouraging investment, security, education, among others. On the other hand, there is the transition generation that must be taken into account and whose pensions will be paid by the federal administration, i.e., the government coffers”.

For Moreno Brid et al (2017: 62) the relatively stable deficit process experienced in Mexico during previous years, brought as a consequence the weakening of gross fixed capital formation, and instead of using the oil excesses from 2003 to 2014 in increasing and strengthening public investment, as occurred between 1977 to 1981, co-current spending was increased, pointing out: “...given that in political terms it is more viable to cut public investment projects than to lay off government employees or reduce their salaries, the composition of public spending has steadily shifted away from fixed capital formation, in favor of current spending”.

The Centro de Estudios de las Finanzas Públicas (CEFP) – Center for Public Finance Studies-(2018: 0) mentions that in the last decade the federal budget resources allocated to pension and retirement payments have increased considerably, from 2008 to 2018 they practically doubled in real terms, going from 388,660 million pesos to 793,734 million pesos budgeted, representing 2.06% and 2.5% of GDP respectively in 2008 and 2018. Going to 94.1% to pay pensions and retirements, while the remaining 5.9% percent corresponds to coverage of social security contributions.

In other similar data, the Superior Audit Office of the Federation (ASF, 2020: 22) points out that from 2013 to 2018 the increase recorded in the defined benefit pension item grew 6.1% on average per year, going from 576,756 million pesos to 775,859 million pesos exercised.

According to estimates by the Ministry of Finance and Public Credit, in the year 2023 the payment for pensions and retirements will be equivalent to 4.1% of GDP, with adults over 60 years of age reaching 12.28% of the national population, but the biggest problem will be con-centered in later years, where by the year 2050 adults over 60 years of age will represent 21.5% of the national population (CEFP, 2018: 1).

Until before the December 2020 reforms to the national pension system, the National Commission for Retirement Savings (CONSAR)envisioned that few workers would meet the requirements to retire at age 65, let alone at age 60, and most of them will do so with the minimum guaranteed pension (CEFP, 2018: 1).

As of 2018, there were close to 23 million active workers with access to pensions, of which 86.3% corresponded to IMSS (Insurer and Employer), 11.3% to ISSSTE, 1.1% to ISSFAM, 0.7% to PEMEX, 0.4% to CFE and 0.2% to state public universities (ASF, 2020: 28). Of the total number of workers in 2018, 34.4% are affiliated to the defined benefit regime and 65.6% to the individual accounts or capitalization regime.

Finally regarding this part, it can be said that another of the problems located in the different pension regimes in Mexico is that the working population does not have an adequate basis for financial education on pension issues (Columna, 2021: 90). In this sense, knowledge of the general aspects of the savings-withdrawal systems is important for users to know during their productive stage, since these funds will be their economic support when they retire from their working life.

In addition to the low financial education of the pension system, a large part of the risk associated with the individual accounts pension system has been transferred to the workers, which is why they need to understand very well how these social security schemes work. On this issue, Azuara et al (2019: 45) state: “However, in Mexico only 12% of the population understands the concept of interest plus principal and 3% of the concept of compound interest (CEF, 2017). The lack of financial and pension knowledge often results in people making decisions contrary to their interests”.

In a study conducted by Hernández et al (2020: 13) on the knowledge that users of the retirement savings fund have in Ciudad Juárez, Chihuahua, they reach the conclusion that in no age range (youth, adults and seniors) do they have sufficient and basic knowledge of the savings accounts and funds that they will use in their retirement, obtaining such users a score of 5.3 points, which reminds us of the auto-res in the academic system implies being flunked, expressing in this regard: “A low level of knowledge has consequences both in working life and at retirement. During working life, the individual does not worry about saving, partly because he sees this situation as very distant, and this leads him to save little or not at all. At the time of retirement, the amount of resources that their pension savings fund will provide will be insufficient and they will have difficulties in meeting their expenses...For this reason, it is urgent to promote financial education among the population from the basic levels of the educational system, since knowledge provides better decision-making...”

IMSS as Employer

The Mexican Social Security Institute (IMSS) has two types of pension obligations: as an employer and as an insurer, with differences between the two. The IMSS as employer is based on the Collective Labor Agreement signed by the union with the Institution and has a Retirement and Pension System specific to the workers who render their services in the IMSS.

The retirement received by IMSS workers contains better rights and prerogatives than those instituted for general workers of private companies in Mexico (Herrera et al, 2017: 214). Through the celebration of the collective contract of workers belonging to the IMSS, they obtain additional benefits to those established by the Social Security Law, which generates a significant pressure on the Institute's finances (CEFP, 2019: 9).

The IMSS-Patron had 302,677 of pensioners in the defined benefit system in 2018, which represented 5.5% of the total number of pensioners nationwide. According to Table 1, it can be seen that total IMSS-Patron pension spending accounted for 11.3%, 11.8% and 11.4%, respectively in 2018, 2019 and 2020, with a 16% increase in spending in 2019 and 5.7% in 2020. With the aforementioned figures, it can be seen that there is no reciprocity between the percentage of pensioners and the amount of federal public spending resources that IMSS-employer pensioners receive, since the relative participation of the spending is greater than double in the case of retirees, observing that in 2018 they had 5.5% of workers who were left with 11.3% of total pension resources in the country.

Of the national income produced in a year (GDP), the pensions and retirements collected by former IMSS workers are equivalent to 0.38%, 0.40% and 0.45% respectively in 2018, 2019 and 2020. To get an idea of what the amount allocated to IMSS-Patron pensions means, I can say that this amount is equivalent to a higher figure than the total amount that is recollected in the 2,457 municipalities in the country (including Mexico City) for real estate property taxes (property tax, transfer of ownership), which stands at 0.33% of GDP for 2019.

In another interesting comparison, Table 2 shows that in 2018, 2% of IMSS-Patron defined benefit pensioners earned between 5 and 10 thousand pesos per month; 42.5% earned between 10 and 20 thousand pesos; 50.5% earned between 20 and 40 thousand pesos; and 4.5% earned between 40 and 60 thousand pesos.

Table 2. Pensions Severance, Old Age by Defined Benefit. Monthly 2018

Thous.Pesos	IMSS.Insurer	%Total		IMSS.Patron	%Total		ISSSTE	%Total		PEMEX	%Total		CFE	%Total	
>1 a 5	1,536,349	69.8%	46.4%	1,014	0.4%	0.0%	12,764	1.7%	0.4%	24	0.0%	0.0%	1	0.0%	0.0%
>5 a 10	288,481	13.1%	8.7%	5,186	2.0%	0.2%	191,157	25.7%	5.8%	4,794	9.1%	0.1%	22	0.0%	0.0%
>10 a 20	198,079	9.0%	6.0%	108,970	42.5%	3.3%	271,942	36.6%	8.2%	30,491	57.8%	0.9%	782	1.4%	0.0%
>20 a 40	144,357	6.6%	4.4%	129,345	50.5%	3.9%	267,301	36.0%	8.1%	12,102	22.9%	0.4%	10,962	19.4%	0.3%
>40 a 60	31,546	1.4%	1.0%	11,647	4.5%	0.4%	8	0.0%	0.0%	2,722	5.2%	0.1%	14,939	26.4%	0.5%
>60 a 80	2,270	0.1%	0.1%	201	0.1%	0.0%	3	0.0%	0.0%	1,665	3.2%	0.1%	14,939	26.4%	0.5%
>80	5	0.0%	0.0%	3	0.0%	0.0%	5	0.0%	0.0%	980	1.9%	0.0%	14,939	26.4%	0.5%
Sum	2,201,087	100.0%	66.5%	256,366	100.0%	7.7%	743,180	100.0%	22.5%	52,778	100.0%	1.6%	56,584	100.0%	1.7%

Source: Own elaboration. With information from Auditoría Superior de la Federación: Pensions under the defined benefit regime (2019, p. 84,86,89,91,92).

Thus, in 2018, 50.5% (more than half) of IMSS-Patron retirees received 20 to 40 thousand pesos monthly, while of IMSS-Insurer pensioners (workers in the country's private companies) only 6.6% received that level of income. As can be seen in relative terms, 50.5% versus 6.6% are not comparable at all. What is worse, in 2018, 69.8% of pensioners received less than 5 thousand pesos in the IMSS-Insurer, while 0.4% of the IMSS-Employer received that amount.

Based on the IMSS Financial and Actuarial Report as of December 31, 2018 (2019: 153), there were 303,822 IMSS-Patron retirees and pensioners as of 2018, with an average age of 63.1 years, according to the actuarial valuation practiced in 2018 the labor-actuarial liability of those retirees was 1.79 billion pesos, representing 7.9% of the GDP in 2018.

According to the information cited above, the IMSS (2019: 153) in 2035 will have the largest number of retirees under the defined benefit regime and as the years go by they will be decreasing, with which the pressure on public finances will be reached in the mid-thirties of this century.

The Financial and Actuarial Report (IMSS, 2109: 156) tells us that by 2036 the highest annual retirement expenditure will be reached with an amount of 191,881 million pesos in 2018, recalling that although the labor liability no longer continues to increase, the IMSS must face a growing flow of retirement payments, derived from the current workers and their future incorporation to the group of pensioners.

According to Lockton Mexico's actuarial valuation (IMSS, 2019: 157) the present value of the total obligations of the IMSS retirement and pension system as an employer as of 2018 is estimated at 2.7 billion pesos, 11.96% of GDP for that year, which corresponded to 303,822 retirees and pensioners in course of payment and 173,177 active workers of the Institute itself. Of the total estimated present value, 1.93 billion correspond to retirees and pensioners as of 2018, of which 1.79 billion are already accrued (recognized in IMSS financial accounting statements), in accordance with Financial Reporting Standard D3.

In other information prepared by the Center for Public Finance Studies (CEFP, 2018: 15) based on 2017 IMSS data, they came to foresee that in the same way in 2035 the highest number of retirees and pensioners would be reached with the amount of 399,505 according to their projections, a slightly lower figure than the one provided by the IMSS itself the following year, where an expenditure of 122,954 million pesos will be required, which will be decreasing from that year onwards.

For the OECD (2016: 25) the actuarial deficit of the pension systems improved as of the reform to the scheme of the Retirement and Pension System (RJP) of IMSS workers (August 1, 2008), from representing the IMSS-Patron 13.2% of GDP before the reform, to representing 7% of GDP after it, observing a reduction of 6.2 percentage points of GDP, which is equivalent to slightly less than half of savings.

With calculations from Northern Actuarial Valuations, Azuara et al (2019: 10) point out that with the 2008 reforms to the IMSS-Patron Retirement and Pension System (RJP), resources will be increasingly required until 2030, equivalent to 11 percentage points of GDP in 2018.

According to the most recent information from the IMSS (2021: 255) the accrued liability of the IMSS-Patron retirement and pension regime for defined benefit obligations amounts to 2.6 billion pesos as of December 31, 2020, representing 11.9% of the 21.9 billion of GDP in that year.

Finally, emphasize that each IMSS-Patron retiree and pensioner in 2018, cost the national public finances 278,917 pesos annually (84,741.1 million pesos among 303,822 retirees), an average of 23,243 pesos per month (Aguinaldo included).

IMSS as Insurer

According to information from the Ministry of Labor and Social Welfare (STPS, 2021), as of the first quarter of 2021, the country's EAP corresponds to 55.4 million people, where 53 million people are employed, of which 23.8 million workers are enrolled in the formal sector of the economy, equivalent to 44.9% of the country's employed population. The IMSS as of May 2021 presents 20.2 million workers, representing 84.8% of the total number of formal jobs in Mexico, with this we get an idea of the magnitude and importance for the nation of the employed population that is enrolled in the IMSS and that works in the private sector of the Mexican economy.

In 2018 there were 5.5 million defined benefit system pensioners in total in Mexico, of which 3.6 million pensioners corresponded to the IMSS-Insurer, re-presenting 65.7% of the total pensioners in the country. If we add the employees of the IMSS-Employer with the IMSS-Insurer, we would have 3.9 million defined benefit pensioners in the IMSS.

With the most recent information available, as of December 31, 2021, there were a total of 4.7 million IMSS pensioners, while the ISSSTE would have 1.2 million retirees (Nolasco, 2022).

In another comparative point, of the subsidy or transfer granted by the federal government for IMSS-insurance pensions in 2020, one out of every four pesos is paid with contributions to this item by workers and companies in Mexico's private sector.

Of the total public spending on pensions, the IMSS-Insurer absorbs 41.2%, 42.8% and 43.5% respectively in 2018, 2019 and 2020. This speaks of two aspects: 1) Private sector workers receive fewer resources from the public sector for pensions in proportion to the total number of pensioners in the country; and 2) Workers' pensions are lower than those received by state employees in all areas.

The above data shows that of the total public expenditure allocated to national pensions, the IMSS-Insurer receives little more than 40 cents of each peso, even though it has almost two thirds of the country's total pensioners. This is explained by the disparities that 70% of IMSS pensioners received less than 5 thousand pesos per month in 2018, while IMSS-Patron only has 0.4% in this range, ISSSTE 1.7% (PEMEX and CFE do not have such low pensions for them). As of 2019, the IMSS had 2,366,954 severance and old age pensioners in Mexico, who had an average age of 70.7 years and an average pension of $6,051.49 pesos per month.

At present, IMSS workers have two regimes for obtaining a pension in Mexico: based on Law 73 (in transition) or Law 97. The federal government must comply with the payment of IMSS Law 73 pensions in accordance with Article 2 of the Social Security Law (LSS), which states that the purpose of social security is to achieve the right to health and medical assistance, as well as the granting of a pension that will be guaranteed by the State, as long as they comply with the established legal requirements.

The obligations generated or emanating from the transition regime will continue to put pressure on federal public finances in more than two decades, reaching their maximum according to the Center for the Study of Public Finances (CEFP, 2018: 10) in the year 2040, when 760,185 million current pesos will have to be disbursed, where it is observed that by Law 73 pensions will increase annually by an average of 4.7% and more than 2.75 times the public budget approved for IMSS-Assurance pensions in 2018 will be allocated.

In reference to the actuarial deficit projected for the future, the OECD (2016: 25) and Héctor Villareal & Alejandra Macías (2020: 53) show us that the IMSS-Insurer in the defined contribution pension system would absorb resources equivalent to 61. 4% of GDP before the 1997 reforms, rising to 44.1% of GDP after that reform, which would mean 17.3 percentage points of GDP in savings of public resources destined to IMSS-Assurance pensions, equivalent to 28% of savings, without taking into account the recent reforms of 2020.

The IMSS transition generation that has a defined benefit scheme will reach its maximum pressure on public finances around the year 2034-2035, according to the Superior Audit Office of the Federation (CIEP, 2017; cited by Azuara, 2019: 47), and will be present until 2090 when this generation will be extinguished. Although in my point of view it will be much earlier.

Based on the assumption that an 18-year-old worker started working before June 30, 1997, so that it would be understood that he/she was born in 1979, he/she would have to turn 65 in 2044, according to Law 73 of the IMSS and considering that the worker or spouse would live on average until 79 years of age, it would give that by 2058 the State's obligation to cover the pension would end. It should be clarified that if only the wife survives, she would receive a small part of the pension enjoyed by her husband during his lifetime.

Another of the additional pressures on public finances generated by Law 73 is the Continuación Voluntaria al Régimen Obligatorio del Seguro Social -Voluntary Continuation of the Mandatory Social Security Regime-, colloquially known as modality 40, which according to the Social Security Law can reach up to 25 minimum wages, However, in practice it was limited by the IMSS administrative authorities to 25 UMA and the Suprema Corte de Justicia Nacional (SCJN) -Supreme Court of Justice of the Nation- limited by jurisprudence to 10 minimum monthly salaries, which the IMSS does not currently apply.

As of December 2010, there were 72,347 workers registered in IMSS modality 40, by September 2020 there were 199,860 workers in this modality, which implies that in ten years this modality had 127,513 more contributors, which means an increase of 1.76 times or an average growth of 17.6% annually. With this data, we see that it is economically very profitable for workers to opt for Voluntary Continuation of the Mandatory Social Security Regime (COVORO) before retirement.

The Superior Audit Office of the Federation (ASF, 2020: 37) in consideration of the pressure exerted by modality 40 on national public finances expresses: "...the IMSS must carry out a study of relevance to regulate the possibility of workers to increase the contribution salary considering gradual increases or the establishment of ranges, based on the last salary of the worker, in order to avoid greater pressure on the stability of public finances and with the results, if appropriate, promote the modification in the Internal Regulations of the Mexican Social Security Institute, so that they establish ranges in the choice of the contribution base salary and that the insured does not increase it in a radical way, which represents an increase in the fiscal cost".

In 2021 the Unidad de Medida y Actualización (UMA) –Unit of Measurement and Updating- is $89.62 pesos per day, so that a pension capped at 25 UMA would reach $68,148.50 pesos per month (89.62*25*(365/12)). In 2021 the minimum wage is $141.70 pesos per day, so the pension capped at 10 minimum monthly wages would be $43,100.42 pesos (141.7*10*(365/12). Thus we see that there is currently a difference of $25,048.08 pesos between the maximum of 25 UMA and 10 minimum wages, representing 58% of the latter amount (substantial difference).

In order to reach the maximum IMSS pension ceiling in mode 40, the following three conditions must be met:

- To have more than 2,000 weeks of IMSS contributions, which implies more than 38 uninterrupted years of work.
- The rules of modality 40 handled by the IMSS authorities do not allow updating each year to the maximum limit, but the amount of the pension will be obtained with the last 250 previous weeks (5 years), which tells us that pension applicants in 2021 would properly do it with the limit of 25 UMA of 2016. If the pension was obtained in 2022, it would be obtained with the 25 UMA of 2017 and so on.
- Having reached 65 years of age for the pension to be granted at 100%, if you are 60 years old it would be equivalent to 75% of the pension, advancing proportionally for each additional year in which the pension is requested by an additional 5%.

Fulfilling these three conditions, the maximum pension that the IMSS would grant in 2021 that has been obtained through mode 40 would be $58,050 pesos per month, which would require having invested a total of 321,900 pesos (5,500 pesos per month) for 58 months (250 weeks). In this way, if the IMSS administrative authorities had allowed it in 2016, contributing with a minimum salary of 2,322 pesos per month, one could reach a little more than 58,000 pesos per month (with the indispensable condition of having around 2,000 weeks of contributions and 65 years of age).

The warnings of the Federal Supreme Audit Office, the Organization for Economic Cooperation and Development (OECD), former Congressman Carvajal Hidalgo and many other people who have pointed out the danger for public finances of the modality 40, due to the amount of resources that would be granted "in excess" in future years, refer to extreme cases such as the one I mentioned.

In my point of view, the great discussion is centered on whether it is appropriate to charge 10 minimum wages or 25 UMA with a maximum ceiling of the modality 40 of the IMSS transition regime (Law 73), which could be resolved when the IMSS Technical Council establishes a maximum ceiling of 10 times the minimum monthly wage, as ruled by the jurisprudence of the Supreme Court of Justice of Mexico, where the twenty-fifth transitory article of the Social Security Law of 1997, which is the cause of all this legal imbroglio, would also have to be reformed, clearly specifying the 10 minimum wages as the maximum ceiling and with that would prevent 'interpretations' of what was meant in that transitory article.

In the opinion of the OECD (2016: 52) the estimated costs of the transitional pension regime in the IMSS are currently estimated at just over 0.5% of GDP, which would peak at between 1 and 1.4% of GDP in the 2040s, at which point it would begin to decline.

With the 1997 Social Security Law (LSS), the federal government will have to guarantee at least the minimum pension established, which according to article 170 of the LSS will be equivalent to the equivalent of one minimum wage and according to article 172 of the LSS, the federal government will have to cover the difference of the minimum guaranteed pension, in case the worker's resources in his/her individual account are not enough to cover it, as we have seen before.

If the pension reforms had not been approved on December 16, 2020, the pressure on public finances would have been greater, since previously a minimum of 1250 weeks of contributions were required to have a pension, but with the reforms, in the first instance 750 weeks of contributions are required, increasing by 25 weeks per year, until reaching 1000 weeks in 2031.

Banco de México (2021: 49) expresses this on the transition between the formal and informal labor market: “This reduction seeks to include in the network of beneficiaries of the system a greater number of workers, and recognizes the structure of the labor market in Mexico, in which a high proportion of workers transit between formality and informality during their lifetime formality and informality during their working life (Levy, 2020; Zamarripa, 2020)”.

In 2021, the current minimum wage is $141.70 pesos per day, which brings the minimum guaranteed pension to $4,310 pesos per month. In 2022, the minimum daily wage is $172.87 pesos, which means that the minimum guaranteed pension would be $5,258 pesos per month.

Table 2 shows that the federal government's Guaranteed Minimum Pension (PMG) has been increasing over the last three years, and it can be said that in 2018 it was not included in the percentages of public spending, while from 2019 and 2020 it represents 0.1% of total spending, an amount that will grow over time, and for 2019 the PMG item grew by 56%, while for 2020 the growth observed is 11%.

In the opinion of Abraham Vela (cited by Franco, 2021), president of the National Commission of the Retirement Savings System (CONSAR), with the pension reforms of December 2020, at least 20 thousand workers of the first generation of the Retirement Fund Administrators (AFORE) will be able to access a pension during the year 2021, a benefit that would not have been achieved without the legislative changes to the social security law, adding in this regard: “I am being very conservative in my estimates, I do not want to err on the side of optimism, but we will undoubtedly see more and better pensions. According to IMSS data, six thousand 284 workers have already accessed this benefit in the first quarter of the year”.

In 2019, the Mexican Association of AFORES (Nolasco, 2022) estimated that twelve thousand people would be thought to have been added to the AFOREs in the first year of application of the '97 law. But with the reforms to the IMSS law in December 2020, the positive impact was that 27,396 workers were pensioned under the '97 law from January 1 to December 15, 2021 (CONSAR, 2022).

For the defined contribution system or individual capitalization of life annuity, Velázquez Luna (Varela, 2021), shows that in the first quarter of the year around 6 thousand workers will receive a life annuity from their savings of the last 22 years, expecting that pensions in this regime will not exceed around two minimum wages and by the end of 2024 it is expected that a group of 300 thousand workers could have access to a life annuity through the AFORE.

According to the most recent information available, CONSAR (2022) indicates that from January 1 to December 15, 2022, more than 27,396 workers were able to obtain their pensions through the AFOREs, which would be the first IMSS pensioners to apply the '97 law.

Most people obtained a guaranteed minimum pension and one or two hundred obtained a larger amount of resources, although some pensions were below three thousand pesos (due to the proportional application of the 750 weeks established in this transition of Law 97) and others were close to eight thousand pesos, depending on length of service, age and contribution salary. In this regard, A. Vela (Franco, 2021) stated that without the recent reform of the retirement system, 97% of the people with the possibility of retiring this year would have been denied, because they did not have the 1250 weeks of contributions previously required.

From Fernando Franco's (2021) interview with Abraham Vela, he noted this in reference to the replacement rate in current pensions: “With the amounts workers receive, the average replacement rate (pension they receive as a percentage of their last salary) is 70 percent. A year ago, without reform, it was 30 percent, one of the lowest levels in the Organization for Economic Cooperation and Development (OECD). Even for workers earning between one and two minimum wages, this rate is between 80 and 90 percent”.

Santiago Nolasco (2022) expresses this issue: "The replacement rate of a Mexican worker was 25% prior to the changes in the law. However, with the reform, it rose to 62% on average, according to Banxico -Bank of Mexico-".

There is no doubt that with the 2020 reforms to the IMSS pension system, the replacement rate of pensions in Mexico increases, rescuing two very important points: 1) Replacement rates increase substantially for all income levels; and 2) The increase in percentage points of the replacement rate is higher for workers earning less than five UMA in relation to those with high incomes, due to the flexibilization of the guaranteed minimum pension, which acts in favor of workers with lower incomes (Banco de México, 2021: 5).

According to CONSAR (2022), the reduction in commissions to be charged by the AFOREs as a result of the December 2020 reform of the IMSS Law will increase the replacement rate by 6%, which will benefit 70 million workers.

On July 1, 2021 Abraham Vela (quoted by Franco, 2021), states the following: “Today, the Retirement Savings System (SAR) celebrates 24 years of life...the changes made with the re-form 'defused a bomb that was ticking'...’it is the reform of reforms of this ad-ministration. Since 1997, when the system was created, there has not been another major reform'...the full, strong impact will begin to be seen in 2031. Today's young people or future generations would be the ones reaping 100 percent of the benefits of the reform”

Bank of Mexico (2021: 10) makes this consideration about the reforms to the IMSS pension system, corresponding to December 16, 2020: “"Thus, the reform in effect in 2021 would mainly benefit those formal workers who retire under law 97, i.e., that their retirement is a function of the contributions made to their individual account”.

Regarding the reforms to the IMSS law in December 2020, Santiago Nolasco (2022) points out that the OECD published its report Pensions at a Glance 2021, where it would highlight that "Mexico carried out the most complete reform in the world".

The Bank of Mexico (2021: 39) points out that with the December 2020 reforms to the Social Security Law, AFORE pensions will range between 2,622 and 8,241 pesos per month, noting: “For example, a worker with SBC –Contribution Base Salary- of 4 to 4.99 UMA, at least 1,250 weeks of contributions, and 65 years of age, it is expected that under both the previous and the new scheme he/she would be entitled to a PMG –Guaranteed Minimum Pension-. Under the previous scheme, the PMG would have been 3,289.34 pesos. With the 2022 reform, the PMG for this worker would be 7,117.0 pesos, 116% higher than under the previous scheme”.

Another important concept for understanding the subject of pensions is that of contribution density, understood as the proportion of periods with contributions that the worker makes to the pay-as-you-go pension system out of the total time he/she has remained or acted in the labor market.

The contribution density in our country has been low as a consequence of the high degree of informality that exists in the Mexican economy. According to figures from the National Commission of the Retirement Savings System (CONSAR), the Contribution Density (CDD) in Mexico is 44.3%, which means that formal employment corresponds to less than half of a worker's working life, becoming an obstacle and impediment to achieving a decent and acceptable pension.

In the opinion of Lagarda & Mandujano (2017: 108) the government should seek to increase contribution density to 50%, which would guarantee an increase in pro-average balances and in replacement rates of just over double, in which case these would reach 48% of the last income, a figure higher than the 24% resulting from the current state (data valid before the December 2020 reforms).

Among the outstanding positive points for the economic, social and human development of our nation, in projections made by the Bank of Mexico (2021: 7), the net assets of the Specialized Retirement Fund Investment Companies (SIEFORE) without the 2020 reforms would reach 35% of the GDP in 2040, while with the reforms they would reach 56% of the GDP.

In this way, SIEFORE assets in 2040 would reach 36 percentage points more than that observed in 2020 (20% of GDP), of which 15 percentage points would be explained only by the inertial growth of SIEFORE net assets compared to the inertial growth of GDP. The difference of 21 percentage points of GDP of the SIEFORE projection would be achieved by the reforms approved in 2020.

Columna Franco (2021: III) points out that the results indicate that public spending in the country will be compromised by the minimum contributory or guaranteed pension, in financial requirements estimated between 9,837 and 34,374.2 million pesos per year according to the contribution density, without forgetting the existing spending on pensioners of the defined benefit regime.

Bank of Mexico (2021: 8-10) points out that the main reforms to the IMSS law in December 2020 will have this impact on national public finances:

- The modification of the social quota and the repeal of the federal government contribution would imply talking about a fiscal benefit estimated at 5.2% of GDP.
- The individual accounts would generate greater resources for workers due to an increase in the percentage of approved contributions, with an estimated benefit of 3.6% of GDP.
- The granting of the guaranteed minimum pension subsidy would result in a fiscal cost of 9.1% of GDP.
- Combining the positive and negative effects on national public finances, there would be a slight social cost (8.8-9.1) of 0.3% of GDP over the entire period analyzed. Between 2023 and 2045 there would be a fiscal benefit of 4.6% of GDP, from 2046 to 2100 there would be a fiscal cost of 5.0% of GDP.

Considering that the effect of the December 2020 reforms to the IMSS Law will be imperceptible in the long term for defined benefit pensions, the actuarial valuations estimated that 44.1% of GDP is the total liability for defined benefit pensions (IMSS Law '73) of the IMSS-Insurer, while for the IMSS-Employer 11.9% of GDP is considered. With this, the total of these two items would give us 56% of the GDP.

III. CONCLUSIONS

❖ Pensions are classified as contributory and non-contributory. Contributory pensions are made up of the resources that workers contribute during their working life, as long as they are employed in the formal sector of the economy. Non-contributory pensions are subsidies or transfers provided by the State to people who were not formally employed. There are two main types of contributory pensions: defined benefit pensions and defined contribution or capitalization pensions. In defined benefit pensions, the worker's funds will go to a common fund and at the end of his productive life will entitle him to receive a secure income until his death, which will be guaranteed by the State. In defined contribution pensions, each worker will have an individual account, which will be capitalized and at the end of his working life will provide him with an income of uncertain amount and will not be financed by the State.

❖ In order to have an idea of the pension systems of different nations, it is common to compare the amount of resources presented by the retirement fund administrators in relation to the GDP of each country, these are the figures of some Latin American countries in 2019: Chile 80.8%; Uruguay 29.1%; Colombia 24%; and Peru 22.8%; Chile with 38 years of application of the system of capitalized accounts, while the other three nations with 25 years of average application. Mexico for the year 2019 presented 16.4% of the GDP in its retirement fund managers, with 22 years of application of individual accounts. These figures show that our country is one of the countries with the fewest resources in its retirement funds.

❖ According to official figures as of December 2021, there are 24.8 million people in our nation with formal employment (43.5% of the employed population), of these 20.6 million people are IMSS beneficiaries (83.2% of the total number of workers with formal employment). It was estimated that 34.4% of active workers are affiliated to the defined benefit system and 65.6% to the individual accounts system.

❖ In the present and especially in the future, defined benefit pension and retirement liabilities will become one of the serious problems of national public finances, as their amount increases every year more than proportionally in relation to public revenue collection. According to recent actuarial valuations, the IMSS-employer has a defined benefit pension liability of 11.9% of GDP, while the IMSS-insurer has a liability equivalent to 44.1% of GDP in defined benefit pensions. Adding both contingent liabilities, the future commitment is equivalent to 56% of the GDP as of December 2021, which is the magnitude of the pension and retirement burden of what has been called the transition regime of Law 73 of the IMSS (defined benefit), which will have an impact on national public finances, especially in the year 2035, when it will reach its maximum point of expenditure of public resources.

❖ Of the pensions of the transition regime of IMSS Law 73 (defined benefit), one of the most debated issues is the one corresponding to the voluntary continuation in the mandatory regime (modality 40), in the aspect of whether the maximum pension ceiling corresponds to 10 minimum wages or 25 units of measurement of updating (UMA), where the Supreme Court of Justice of the Nation issued a jurisprudence that establishes the ceiling of 10 minimum wages in Mexico, but the administrative authorities of the IMSS in practice set the ceiling at 25 UMA. To avoid this controversy, the Chamber of Deputies should modify the Fifth Transitory Article of the 1997 Social Security Law or the IMSS Technical Council should clearly establish it within its internal regulations.

❖ The reforms made in December 2020 to the IMSS Law will primarily benefit workers in the defined contribution regime (IMSS Law 97), due to the increase in resources that will be reflected in their individual savings accounts, which should be capitalized over time. Before the reforms, the replacement rate of a Mexican worker under Law 97 was 25%, while now it is calculated at just over 60%.

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